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THE JOURNAL ABOUT IDEAS AND LEARNING

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Featuring

Howard Gardner

The Father of
**MULTIPLE
INTELLIGENCES**

FOREIGN POLICY &
PROSPECT magazines
Top 100 Leading
Public Intellectuals

The
**UNSCHOOLED
MIND**

5 Minds for the Future

GOOD WORK IN
BUSINESS

ART
FOR OUR
SAKE

Ellen Winner
on

Why school arts classes
matter more than ever



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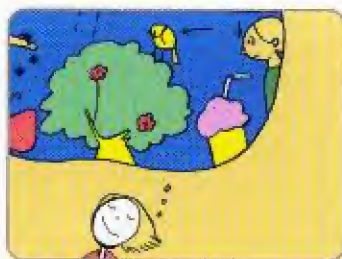
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Howard Gardner Special November 2011



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by Howard Gardner

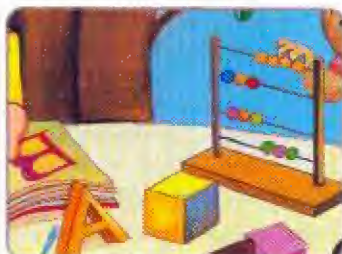
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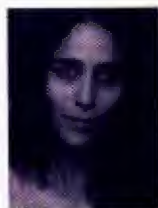
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EDITOR'S NOTE

Appropriating A Master's Legacy



Amruta Patil



Luke Haackip

"I don't think he realizes how much of a super star he is to education students," remarked one student of Howard Gardner in a recent course evaluation. The legacy of Dr. Howard Gardner has come of age and it is time we probably started appropriating his place in history.

Dr Gardner is one of the world's most famous academics and has been named one of the world's top 100 leading public intellectuals by Foreign Policy and Prospect magazines in 2008. In the same year Wall Street Journal also named him one of the top five influential business thinkers. Most recently, he was bestowed with the 2011 Prince of Asturias Award in Social Sciences, which aims "to reward the scientific, technical, cultural, social and humanistic work." His work and writings have motivated teachers throughout the world not only to adapt their teaching and instruction methods to their students but also to expand their own concepts of what intelligence is.

If we had only one intelligence - it would either mean that if we were smart, we are smart in everything, and if we are not smart, we'd be poor in everything. Evidence tells us, though, that people's minds are variegated and their capacities are varying. A person may be good at foreign languages, but not at making music or understanding other people. A person may be good at finding their way about in an unfamiliar site, for example, but that does not mean they would be any good at dancing or at solving a logical puzzle. Dr. Gardner's theory of Multiple Intelligences evolved as a critique of the notion that people have simply a single intelligence.

One of his most influential books, *Frames of Mind*, published over 25 years ago, put forth this theory of Multiple Intelligences and propelled him to worldwide fame. There he debunked the way we traditionally measure intelligence, which is basically by standard psychometric testing of verbal-logical and mathematical intelligences. He propounded that there were many more kinds of intelligences at play. Simply put he challenged the notion that we are born with a single intelligence that cannot be changed.

Dr. Gardner claims that there are at least eight different kinds of human intelligences. Apart from the traditionally recognized two mentioned above there were six others: musical, spatial, bodily/kinesthetic, interpersonal, intrapersonal, and naturalist. To that effect he made two claims, one that everyone has all of these intelligences since it is part of our species definition, and two, that because of our genetics and environments, every one of us has a unique profile of intelligences and not even identical twins share the same profile of intelligences because their experiences are different. We, therefore, all have different kinds of minds so we all also learn in different ways; we have different intellectual strengths and weaknesses so it is important that we keep that in mind in our teaching methods and evaluation.

According to Dr. Gardner, "It's very important that a teacher take individual differences among kids very seriously. The bottom line is a deep interest in children and how their minds are different from one another, and in helping them use their minds well."



Seen here with son Benjamin, Howard Gardner (Centre) and Ellen Winner (Right) will be on a speaking tour to India organised by iDiscover! XSEED in January 2012. Read more about Howard Gardner India tour in page 4.

"In my own work, I'm a proponent of teaching for understanding, which means going deeply into topics so that students can really make use of knowledge in new situations. This is very, very different from most teaching, where people memorize material and can reproduce it on demand but can't make use of it in new situations. That's what understanding entails. If you favor education for understanding the way I do, then MI can be extremely helpful. Because when you are teaching a topic, you can approach the topic in many ways, thereby activating different intelligences." Remarkd Dr. Gardner in a 2008 interview by Kecnan Wellar.

Dr. Gardner is extremely prolific and has written over 25 books and numerous articles and papers on education as well as on other general interest topics.

He is the John H. and Elisabeth A. Hobbs Professor

of Cognition and Education at the Harvard Graduate School of Education. He also holds positions as Adjunct Professor of Psychology at Harvard University and Senior Director of Harvard Project Zero.

He has received many honours including a prestigious MacArthur Prize Fellowship in 1981. He has also received honorary degrees from 26 colleges and universities, including institutions in other countries Bulgaria, Chile, Greece, Ireland, Israel, Italy, and South Korea. He also holds positions as Adjunct Professor of Psychology at Harvard University. He was a founding member and director of Harvard Project Zero, an educational research group housed at the Harvard Graduate School of Education focusing on cognition and the arts.

His research in the past two decades has gone far beyond intelligence, with projects on creativity, leadership, professional ethics, and trust, including an ongoing project that looks at ethical decisions that young people make in cyberspace, how the new digital media are affecting young people's cognitive capacities, dispositions, and ethical senses. Gardner argues that it is far more complex, but still possible, to approach truth, beauty, and goodness in a digital era, but its pursuit should be anything but automatic.

This special issue is a preview to Dr. Gardner's India tour in January 2012 and celebrates his contribution to the world of learning by presenting to you a selection of his writings.

Luke Haokip

iDiscoveri XSEED presents

HOWARD GARDNER

India Tour 2012



iDiscoveri Education is honored to host the Howard Gardner India Tour 2012; the most significant public thought leadership engagement to touch the Indian education domain in several decades. Dr. Howard Gardner, the father of the famed theory of "Multiple Intelligences" and the legendary professor of cognitive psychology at the Harvard Graduate School of Education, is considered among the 100 most influential public intellectuals in the world. Prof. Gardner is a rare scholar who has been able to overturn the accepted direction of thought and action of for an entire domain across countries within his own lifetime. Through his research and writing he has reframed how psychologists, educators and policy makers think about what the human mind is gifted at and how best to nurture it to its full potential.

iDiscoveri XSEED presents

A once in a lifetime opportunity to listen to the master himself

Dr. Howard Gardner, the father of the famed theory of "Multiple Intelligences" and the legendary professor of cognitive psychology at the Harvard Graduate School of Education, is considered among the 100 most influential public intellectuals in the world. Prof. Gardner is a rare scholar who has been able to overturn the accepted direction of thought and action of for an entire domain across countries within his own lifetime. Through his research and writing he has reframed how psychologists, educators and policy makers think about what the human mind is gifted at and how best to nurture it to its full potential. During the past two decades, Prof. Gardner's work has touched every conceivable aspect of education including curriculum, instruction and pedagogy and extended into arenas of leadership, change, ethics and creativity.

Howard Gardner is coming to India. iDiscoveri Education is honored to host the Howard Gardner India Tour 2012; possibly the most significant public thought leadership engagement to touch the Indian education domain in several decades. Accompanied by his wife and collaborator Prof. Ellen Winner, herself an expert on gifted children, Dr Gardner will undertake a three-week five-city tour between January and February 2012. The tour will include an array of public speaking engagements, policy dialogues, and deliberations with intellectuals and media.

Prof. Gardner's visit is timed to coincide with deep-seated changes sweeping through the Indian education domain. For far too long parents, schools and government in India have been obsessed with rote-memorization, examination performance and narrow definitions of career success. Shifting parental demand, changes in policy and the rise of the private education sector are beginning to shift this discourse – but real action at scale is hard to find. Our public life sorely demands creative, ethical leaders who are able to set an example and influence the majority. Prof. Gardner's substantive research and inspiring message on how to attend to the unique gifts of every child, and make learning more about understanding and changing the world around us, can help catalyze leaders to action on these pressing issues.

During his three-week tour, Prof. Gardner will visit New Delhi, Mumbai, Bangalore, Chennai and Hyderabad. The cornerstone of his engagements will be five public thought leadership events where he will speak to a gathering of 250-300 education and industry leaders in each city on a

range of pertinent topics including Multiplicity of Intelligences, Teaching for Understanding, Minds of the Future and Ethical Leadership. These public events are expected to generate serious dialogue in the Indian public and the media. He will also address a special session for government policy makers in New Delhi where he will paint his vision of the education systems of the future. He will visit several schools, NGOs and public institutions to experience first-hand the challenges and opportunities in the country. He will also offer a select set of talks to private audiences where he will address leaders of corporate and non-profit organizations on issues of leadership, creativity and ethics in organizations. To amplify the message of the visit to a wider audience a communication campaign is being conceived that includes debates on national television, a special print campaign on education reform and direct engagement with parents and schools.

iDiscoveri invites select like-minded foundations and corporations as lead sponsors for the Howard Gardner India Tour 2012. By supporting the Howard Gardner India Tour 2012 with your resources, time and commitment, you will play a key role in catalyzing progressive thought and action in the Indian education and public leadership domain, when it is needed most. You will have a unique opportunity to engage directly with perhaps the most influential education thinker alive and be part of an unprecedented communication campaign to schools, society, government and business for changing the way we learn and lead.

The tour is conceived and hosted by iDiscoveri Education, a leading social enterprise working toward the transformation of school education in India. A team of 250+ passionate professionals including education specialists and management practitioners is led by alumni of Harvard, Cambridge, IIT & IIMs. Its founder and CEO Ashish Rajpal is a Harvard alumnus and a former student of Prof. Gardner. iDiscoveri's flagship program XSEED now reaches close to 700 schools in 22 Indian states showing visible impact on the learning of over 250,000 children by transforming curriculum, professional development and assessment in the classroom. iDiscoveri's work draws from and actually puts into practice a number of tenets of Prof. Gardner's work and is therefore suitably placed to help in the dissemination of his ideas in India.

To receive more information on how you can support the iDiscoveri XSEED Howard Gardner India Tour 2012, please contact Anustup Nayak (Partner, iDiscoveri Education) at anustup@idiscoveri.com.

iDiscoveri XSEED presents
HOWARD GARDNER
India Tour 2012

REGISTRATION FORM

Name: _____ Age: _____

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<input type="checkbox"/>	School Owners / Principals / Corporates / NGO	₹ 4000	₹ 5000
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Students and teachers will have to carry identity cards on the day of the event without which entry will be restricted.

City in which you wish to attend (Please tick ☒):

☐ Chennai - January 24, 2012

☐ Bangalore - January 27, 2012

☐ Mumbai - January 31, 2012

☐ Hyderabad - February 3, 2012

☐ New Delhi - February 7, 2012

Payment Details:

Cheque / Demand Draft No: _____ Dated: _____

Bank: _____ Amount: _____

Payment should be in favour of iDiscoveri Education Pvt. Ltd. payable at New Delhi.

To register online and for more information please visit: www.howardgardnerindiatour.com

Please mail us the filled-in form at the address below:

iDiscoveri Education Pvt. Ltd.

4th Floor, Emerald Court, Sco 57, Sector 29, Gurgaon - 122001, Haryana, Ph: +91-124-2556000, Fax: +91-124-2556001

Contact Person: Rupal Sancheti | rupal.sancheti@idiscoveri.com | +91 9821218676

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- Please complete all sections of the form in capital letters and kindly provide the details
- Delegate registration fees is payable in advance along with duly filled registration form. Spot Registrations are not encouraged. Kindly retain a copy of the Registration Form for your reference
- The registration fees received is non refundable in case of cancellation / no show / absence of the delegate but change in nomination is acceptable. If you have not received any acknowledgement before the event, please call us to confirm your booking.

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iDiscoveri XSEED presents

HOWARD GARDNER

India Tour 2012

Dr. Howard Gardner will undertake a three-week five-city tour between January and February 2012. He will be accompanied by his wife and collaborator Prof. Ellen Winner, herself an expert on gifted children. The tour will include an array of public speaking engagements, policy dialogues, and deliberations with intellectuals and the media.

Itinerary

City	Date
Chennai	25-Jan-2012 (Tue)
Bangalore	27-Jan-2012 (Fri)
Mumbai	31-Jan-2012 (Tue)
Hyderabad	03-Feb-2012 (Fri)
New Delhi	07-Feb-2012 (Tue)

*This is a tentative schedule subject to change.

Agenda



Drawing from his more than four decades of work **Dr. Gardner** will speak on a number of topics including:

- Multiple Intelligences
- Teaching for Understanding
- Good Work – Meeting of ethics and excellence
- Five Kinds of Minds for Future Leaders



Prof. Ellen Winner will give a selected set of public talks on her areas of specialization:

- Nurturing Gifted Children
- Cognition of the Arts

Contact:

For **Partnership** contact Anustup Nayak (Partner, iDiscoveri Education) at anustup@idiscoveri.com

For **other queries** email: howardgardnerindiatour@idiscoveri.com

THE GOAL OF EDUCATION IS TO HELP PEOPLE USE THEIR MINDS BETTER

On the eve of his visit to India in early 2012, **Dr Howard Gardner** lays out his life work, what he plans to share during the tour and why he is a great admirer of Mahatma Gandhi.

Greetings, I'm Howard Gardner and I am speaking to you from Cambridge, Massachusetts, in the United States. Because I'm about to make a trip to India I'd like to tell you a little bit about who I am and about my background, some of the reasons why I am looking forward to my trip, talk about some of the work that I've done in the past and then finally the issues that I've been thinking about at present and going forward.

Early Days

I am American born from parents who came from Europe, from Germany and I lived in Pennsylvania in the North East of the United States until I became a student in Harvard College many years ago, in fact this is my 50th year being in Harvard – first as a student, then as a researcher and most recently as a professor.

I began with an interest in psychology and social science and began as a researcher but then moved a lot into the area of education. A lot of my work in the last few decades has been educational practice and policy and my primary affiliation is with the school of education and then more recently I've been looking at broader questions of the kind of society we have and the kind of society I think we ought to have – so I've been moving, we might say, into the area of vision and trying to envision the world different from the way that it is.

On India and Mahatma Gandhi

Even as young person I was always interested in India. India going back for a millennia has been the seat of great civilizations, important ideas, important practices, great art



Dr. Howard Gardner is the John H. and Elisabeth A. Hobbs Professor of Cognition and Education at the Harvard Graduate School of Education. He also holds positions as Adjunct Professor of Psychology at Harvard University and Senior Director of Harvard Project Zero. Among numerous honors, Gardner received a MacArthur Prize Fellowship in 1981. He has received honorary degrees from 26 colleges and universities, including institutions in Bulgaria, Chile, Greece, Ireland, Israel, Italy, and South Korea. In 2005 and again in 2008, he was selected by Foreign Policy and Prospect magazines as one of the 100 most influential public intellectuals in the world. The author of 25 books translated into 28 languages, and several hundred articles, Gardner is best known in educational circles for his theory of multiple intelligences, a critique of the notion that there exists but a single human intelligence that can be adequately assessed by standard psychometric instruments.

and it also happens to be the country in which the person lived who I think happens to be the most important human being for the last thousand years and that's the mahatma, Mahatma Gandhi. Now you may think that it is odd that an American saying the praises of Gandhi particularly because at present it is not easy to see his influence in contemporary India but when I say a thousand years, I'm keeping a very broad prospect. I think that the ideas that Gandhi developed about how human beings relate to one another, what people do when they do not agree about things, about the kind of stance that you have to be prepared to take in terms of your value system – incredibly important but it will probably take a long period of time to see whether or not the Gandhian ideas take hold both in Asia and in the rest of the World.

Even though I've had an interest of many decades in India, in fact I've written about Gandhi in three of the books I've written, I've never made a trip to India and so when I began to speak to Ashish Rajpal, who was a student of mine in Harvard and then to his colleague Anustup Nayak, who also was a Harvard student and we talked about the possibility of making a trip to India early in 2012. I became very excited about the idea – like many people I'm interested in traveling to new places, meeting new people, having a chance to exchange ideas with people in education, with policy makers, with thought leaders, people who can write about ideas that are in the air, people from different sectors of the society – from art, from universities, from business, from the non-profit sector and even though I would be giving talks in several cities during the period of my visit, I'd expect to gain to learn at least as much, probably more than I can give to the audiences and to the people with whom I meet.

His Work in Education

So that's a bit about my identity and my motivation about making a trip to India. Let me be a bit more specific about my own work. As I mentioned, I was trained in psychology in particular in cognitive psychology—how



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human beings think about things and in developmental psychology—how our thoughts develop from childhood to latent life and as part of that empirical work with young people and with other populations including brain damaged adults, I developed, thirty years ago, a theory called the Theory of Multiple Intelligences. And that theory posits that instead of there being a single general intelligence which people have in varying degrees. That instead, people have a lot of relatively independent faculties or abilities, which I call the Multiple Intelligences. And even though I saw this principally as a contribution to psychology, in fact, the area where it has really taken off is in the area of education and there are multiple intelligence schools, classrooms and even networks of schools in many societies including in India.

Education for Understanding

This interest in the part of educators led me think more about how I conceptualized education and for me the important goal of education is to help people use their minds better to think about what's true in the world and what's not true, what's beautiful and what may not so qualify, what's ethical and what's not. And I see school is the place where once we become literate we acquire the various tools that people have developed over the years, the various academic disciplines, history, science, mathematics, the arts and the various professions—journalism, engineering, architecture that people developed to figure out how to understand the world and how to get things done. As part of the theory of multiple

intelligences I've thought a lot about individuation, how do we teach each human being so that he or she can learn the best and how do we assess each person so he or she can show what they have understood and what they haven't understood about truth, beauty, goodness and the like.

On Pluralisation: Presenting Ideas in Different Ways

Also as part of my work in education I have thought a lot about pluralisation and that means presenting important ideas in many many different ways. When there is an important idea whether it comes out of history or

mathematics or the arts or politics, we can't just present it once, we have to present it in many ways and many times. And the more different ways in which we present ideas, the more intelligences that we can activate, the more likely there is that the person will really understand the idea, the topic, the theory that we are talking about.

And when I come to India, I will speak a lot about developing minds, about education for understanding, about how to individuate and how to pluralise the things that we think are important.

On Excellence

Also in the last few decades, I've thought a lot about excellence. What does it mean to be truly excellent in something. I've studied excellence in leadership—what it means to be an excellent leader, which includes management but goes beyond management because leadership involves presenting visions of how the world should be and how the world can be. I've thought and written a lot about creativity—what does it mean to be an excellent creator, to come up with new ideas to implement them and to convince other people of those ideas. And I've thought a lot about what it means to be an excellent worker, an excellent citizen. How we can be not just technically proficient but also engaged in what we do and how we can do it at a very high ethical and moral level.

And in my trip to India I will be talking about how we achieve excellence in leadership, in creativity in work, in citizenship, and perhaps as I mention these areas, you can see why I'm so interested in Gandhi. Because Gandhi was tremendously creative, he was a very effective leader, and he thought more than anybody else about what it meant to be a citizen, not just of his state or his nation or his religion but of the entire planet. In an era of globalization that ability to be non-parochial, to think broadly, to place one selves in the largest space, in the largest firmament is so crucial.

I want to talk now about things I've been thinking about recently building on my work in education, building on my work on excellence.



Illustration: Amrita Palli

The goal of education is to help people use their minds better, to think about what's true in the world and what's not true, what's beautiful and what may not so qualify, what's ethical and what's not.

Five Minds for the Future

One thing I've been thinking about is what kinds of minds do we need to have going forwards in the future and I've written a book called *Five Minds for the Future* in which I describe three cognitive areas and two human areas where I think we need to focus our education in the future.

The cognitive areas are the Disciplined Mind – what it means to become truly experts in an area, the Synthesizing Mind – how we put things together which are disparate, which don't necessarily immediately call themselves to be combined, but which needs to be integrated if we are to understand them and if we are to communicate to other people and when we live at a time when we are deluged with information of all sorts much of which is of quite poor quality, the capacity to synthesize is tremendously important.

The third kind of cognitive mind is the Creative Mind, the mind that thinks outside the box, that come up with new ideas, with new practices. It's great to think outside the box but you can't think outside the box unless you have a box. And the box is the discipline and the synthesizing you have done before you can be generally creative.

The last two kinds of minds have to do with the human sphere. I call them the Respectful Mind and the Ethical Mind. The Respectful Mind recognizes that we have tremendous diversity in the world, indeed tremendous diversity in any community of any size. And when people look and behave differently from us we can try to kill them, we can ignore them, we can tolerate them or we can try to work with them and clearly it is best for the world if we respect one another despite these differences maybe even because of these differences.

The Ethical Mind is the mind, which asks not just what rights do I have, human beings are very good nowadays at stating their rights but also what are our responsibilities, what are our duties and I am particularly interested in our responsibilities as workers if you are a professional of some sort—educator, doctor, engineer, architect, lawyer – what are your responsibilities, and if you are a citizen of a community or a state, a nation, a region, the entire world what are your responsibilities. And the Ethical Mind

doesn't always get it right but it thinks a great deal about what it means to be a responsible worker and responsible citizen.

Curriculum: What and How We Teach

As an educator I am also very concerned about curriculum. What is it that we teach and how do we teach. And as I mentioned before I believe in school, once we have become literate its our task to learn about what is true and what's not true, what is beautiful and cherished and what is not good. These issues have become more complex in recent years.

On the one hand we have what we call the postmodern or relativistic critique, which says who am I or who are you to say what is good and beautiful and true—that is just a matter of taste—every country, every state, every group have its own definition of truth, beauty and goodness. And because the technological world that we live in, the digital world, where anything that is posted can be changed, morphed, transformed, forgotten, combined, deleted, posted and so on, and it is very hard to think about truth, beauty and goodness when we have such a fast changing, facile, flexible world. So in a book that I recently published called *Truth, Beauty and Goodness Reframed*, I've tried to think through the traditional curricular goals in the traditional subjects in light of the post-modern critique on the one hand and the very fast changing, flexible digital world on the other—and I expect to be talking about that on my trip to India.

Use Intelligence for the Good

Finally, I've studied intelligence for many years. I find it a very, very fascinating topic but I've become convinced in recent years that the kind of human beings we are and the kind of societies we live in is really much more important than whatever kind of intelligence we have. Because people can be very smart on any definition but if they don't use their abilities and their skills for the good, for trying to bring people together, for trying to work toward peace, to trying to eradicate poverty and disease



Illustration: Amrita Patel

As an educator I am also very concerned about curriculum. What is it that we teach and how do we teach. And as I mentioned before I believe in school, once we have become literate its our task to learn about what is true and what's not true, what is beautiful and cherished and what is not good. These issues have become more complex in recent years.

and hostility, then the use of all that intellect is really for naught.

And I worry about this in terms of the United States, India, China — countries, which have a tremendous focus nowadays on test scores in doing better in comparison but perhaps not enough focus on what's it all for, what kind of place we want to live in, what kind of people we want to be, what kind of a world do we want to live in.

And here as in so many other spheres, Gandhi has something to teach us. I found a nice quotation from Gandhi with which I want to conclude. Gandhi said, "I'm an average man with less than average ability. I admit that I'm not sharp intellectually but I don't mind. There is a limit to the development of the intellect but none to that of the heart."

Well I think in any definition Gandhi was pretty smart. He's probably putting himself down when he says he's not of average ability intellectually, but whether or not there is a limit to the development of the intellect, there certainly shouldn't be a limit to the development of the heart and coming to India next year I want to look as deeply and widely as possible with the kinds of things that you have cherished over the millennia and to figure out how all of us in the world can work together to have a world which we would be proud to live in with human beings that we can also feel very good about. ■



THE HISTORY OF HOWARD GARDNER

As a child he loved reading and music and later became a promising young pianist, good enough to start a career in music. He enrolled at Harvard as a young man and started out as a History major only to be eventually led to cognitive developmental psychology. In 1983 he developed the theory of multiple intelligences and became known the world over. **Ellen Winner**, his colleague and wife, helps us unravel this man who is often referred to as a "Harvard institution in himself."

Howard Gardner's career trajectory as a developmental psychologist parallels that of his age cohort in some ways, while deviating from the canonical pattern in others.

Attracted to developmental psychology by his reading of Jean Piaget and his meeting of Jerome Bruner, he soon gravitated to cognitive development, with a special interest in human symbolic capacities. Following postdoctoral work in neurology and neuropsychology, he pursued complementary empirical research programs in cognitive development and neuropsychology.

His regular production of research articles for the scholarly community was complemented by a steady stream of books, directed principally at the general reader and at college and graduate students. Around 1980 Gardner's empirical work culminated in the positing of the theory of multiple intelligences, for which he is best known. In the 1980s, like many of his colleagues, he moved in a more applied direction, focusing particularly on issues of teaching, learning, and school reform. In the 1990s, he joined forces with two other developmentally oriented psychologists, Mihaly Csikszentmihayli and William Damon, to investigate issues of professional ethics - what he and colleagues term 'good work.'

Gardner is part of the third wave of individuals affected by the rise of fascism in Europe. His Jewish parents, Ralph and Hilde Gardner, fled from their native Nuremberg Germany, arriving in America on the infamous Kristallnacht, November 9, 1938. Gardner was born on July 11, 1943 and grew up in Scranton, a medium sized former coal mining city in northeastern Pennsylvania. He was an excellent student and a promising young pianist.

Gardner quit formal study of music at the start of adolescence but continued to play and teach sporadically, and music remains important in his life. He attended local schools in the Scranton area but claims that his education began in earnest when he arrived at Harvard College in September 1961.

There he studied history, sociology, and psychology, and audited a record number of courses that spanned the curriculum. He also decided to become a scholar rather than pursue one of the standard professions that his family had in mind for him—the first in his family to attend college.

As an undergraduate, Gardner worked with the noted psychoanalyst Erik Erikson. After spending a postgraduate year as a Harvard Fellow at the London School of Economics, where he read philosophy and sociology, Gardner decided to continue graduate studies in developmental psychology at Harvard. In addition to his ties to founding cognitivists Piaget and Bruner, Gardner also worked closely with the psycholinguist Roger Brown and the noted epistemologist, Nelson Goodman. After completing his doctoral studies, Gardner had the opportunity to work with Norman Geschwind, a brilliant and charismatic neurologist, and he was able to pursue *empirical work in both developmental and neuropsychology* for the ensuing two decades.



Gardner was born on July 11 1943 and grew up in Scranton, a medium sized former coal mining city in northeastern Pennsylvania. He was an excellent student and a promising young pianist.

Maintaining his Harvard connection throughout, Gardner avoided the usual tenure ladder and became a Professor of Cognition and Education at the Harvard Graduate School of Education in 1986. Thus, while he is widely traveled, and conducted field research in China in the 1980s, his entire adult career has been spent in Cambridge.

Gardner's work is best described as an effort to understand and explicate the broadest and highest reaches of human thought, with a particular focus on the development and breakdown of intellectual capacities, broadly construed. He was a founding member of Project Zero at Harvard University, a group that is dedicated to the study of higher cognitive processes, with a special focus on creativity and the arts. His work in neuropsychology focused on the breakdown of artistic and other high level skills under various forms of brain pathology. His theory of multiple intelligences recognizes a broad swathe of human capacities, including ones from the arts and from the realm of human

intercourse that have traditionally been considered nonintellectual and perhaps not even cognitive. His studies of extraordinary individuals, including leaders as well as creators, are cognitively construed; he views leadership as an interaction between the minds of the leader and the minds of his or her constituency. And in his recent collaborative research on work, he looks for evidence of work that is not only excellent in quality but also displays a sense of responsibility about the uses to which that work is put.

Gardner is best known, and properly so, for his capacities as a synthesizer of vast amount of research and theory. His first books treated human development from the perspective of the arts (*"The Arts and Human Development"*, 1973); structuralist thought (Piaget, *Chomsky, Levi-Strauss-1973*); *neuropsychology* (*"The Shattered Mind"*)-1975; *cognitive science* (*"The*

Minds New Science "1985) and Developmental Psychology (1978/1982) an original and well regarded text that he elected not to update. With the publication of Frames of Mind in 1983 Gardner began to put forth his own views about the mind. This work introduces the claim that standard views of intelligence are flawed and that human beings are better described as possessing 8 or more relatively autonomous intellectual capacities, termed the multiple intelligences. This work quickly became well known and much discussed and, not surprisingly, Gardner became a far more controversial figure. While continuing to produce works of synthesis, Gardner devoted more of his attention to putting forth his own ideas about creativity (Creating Minds 1993) leadership (Leading Minds 1995), and education (The Unschooled Mind, 1991 The Disciplined Mind, 1999 and Intelligence Reframed 1999). Changing Minds (2004) is an examination of the processes by which individuals change their own minds and the minds of other persons.

While he is best known as a synthesizer, Gardner's other research and professional accomplishments merit attention as well. His early empirical work in developmental psychology demonstrated the trajectory of metaphoric production and perceptual capacities in young children as well as the sensitivity of children to style in different art forms. With Judy Gardner, he was among the first to demonstrate imitative capacities in early infancy. With Dennie Wolf, he traced the development in young children of the range of symbol using capacities. With Ellen Winner, he examined the complementary aspects of two forms of figurative competence-metaphor and irony. Turning to neuropsychology, Gardner was the first investigator in modern times to explore the role of the right hemisphere in linguistic and paralinguistic spheres.



Gardner's theory of multiple intelligence was conceived of as a contribution to psychology but its greatest influence has been in education.

With Ellen Winner, Hiram Brownell, and others, he led a research effort on the breakdown of narrative, metaphoric, and other forms of linguistic and artistic competence's under various conditions of brain damage. He wrote the chapter on "Extraordinary Cognitive Achievement" in the 1997 Handbook of Child Psychology and, with Seana Moran, has produced an expanded and more original update for the 2006 edition. In that updated chapter, Moran and Gardner describe extraordinary achievement across several domains, including art, science, leadership, and moral excellence.

Gardner's theory of multiple intelligence was conceived of as a contribution to psychology but its greatest influence has been in education. First in the United States, and then in many other parts of the world, educators have drawn inspiration from his theory and have created a plethora of applications in the areas of

curriculum, pedagogy, and assessment. Many programs and schools have adopted the phrase "multiple intelligences" and hundreds of books, articles, films, and other adaptations have been created, many with neither Gardner's knowledge nor approval. Spurred in part by this great interest in the educational implications of his work, Gardner has undertaken several projects in education (see pzweb.harvard.edu and his books Multiple Intelligences (1993) and Intelligence Reframed (1999).

He has stressed that neither multiple intelligences theory nor any other scientific innovation can be applied directly in the classroom; educational practice is always a reflection of goals and values, which should be explicit as possible. In his book The Disciplined Mind (1991) Gardner has embraced the educational goal of "understanding in the principal disciplines," via a number of concrete examples, he has

Self described as a happy workaholic, he spends his free time with his family, a close knit group that spans several generations.

Howard Gardner and Ellen Winner



L-R: Andrew, Jay and Kerith Gardner



L-R: Kerith, Benjamin, Ellen and Howard



demonstrated how a recognition of multiple intelligences can aid in the inculcation of disciplinary understanding.

More broadly, in his educational work, Gardner has pushed for recognition and development of a wide range of human capacities; modes of assessment that are natural (e.g. portfolios, process folios, performances of understanding) and that encompass many forms of critical and creative thinking; pedagogical approaches that stimulate imaginative capacities; and institutional settings that encourage productive thought and creation with a range of materials and genres. Among his most important projects and collaborations have been ATLAS communities, Arts Propel, Teaching for Understanding, Project Spectrum, and a study of interdisciplinarity; over the years he has had rich interchanges with the preschools of Reggio Emilia, Italy, the Key Learning Community in Indianapolis, and the New City School in St Louis. His study of arts education in China was the centerpiece of "To Open Minds" Chinese Clues to the Dilemma of American Education" (1989).

By choice, Gardner has not undertaken major editorial or professional roles. He sees himself primarily as an independent scholar and public intellectual. However, with his long time colleague David Perkins, Gardner has been instrumental in the founding and flourishing of Project Zero, now one of the oldest and most respected educational research sites in the world. He is an accomplished grant getter and has also helped to raise significant funds for Harvard University. He belongs to numerous honorary societies and has won various awards, including a MacArthur Prize Fellowship in 1981 (the first year of the Fellowship), the Grawemeyer Award in Education (first American to win this award) in 1990, and the Guggenheim Fellowship (2000). He is also the recipient of 20 honorary degrees including degrees from universities in Italy, Ireland, Israel, and Canada. Married since 1982 to developmental psychologist Ellen Winner, he is the father of four children: Kerith (b. 1969), Jay (1971), Andrew (1976) and Benjamin (1985). Self described as a happy workaholic, he spends his free time with his family, a close knit group that spans several generations. ■



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Howard Gardner answers FAQ on **MULTIPLE INTELLIGENCES**

Q. Is Multiple Intelligences really a theory? Can it be confirmed by experiment? Do brain sciences continue to support it?

HG: The term "theory" oscillates between two quite different meanings. Among physical scientists, the term is reserved for an explicit set of propositions which are linked conceptually and whose individual and joint validity can be assessed through systematic experimentation. Among lay persons, the term is used to refer to any set of ideas put forth orally or in writing – as the man on the corner says, "I've got a theory about that."

Multiple Intelligences falls somewhere in between these two uses. There is no systematic set of propositions which could be voted up or down by a board of scientists. On the other hand, the theory is not simply a set of notions that I dreamed up one day. Rather, I offer a definition, a set of criteria for what counts as an intelligence, data that speak to the plausibility of each individual intelligence, and methods for revising the formulation. In many sciences, theories occupy this intermediary status. Certainly, theories in the social sciences attempt to be as systematic as possible yet they are rarely proved or disproved in a decisive way. And broad theories in the natural sciences, like evolution or plate tectonics, are similarly immune from a single, simple test. Rather, they gain or lose plausibility on the basis of an accumulation of many findings over a long period of time.

In brain sciences, a decade is a long time, and the theory of multiple intelligences was developed over two decades ago. We now know much more about the functioning and development of the nervous system. I find the neurological evidence to be amazingly supportive of the general thrust of MI theory. The evidence supports the



particular intelligences that I described and provides elegant evidence of the fine structure of such capacities as linguistic, mathematical, and musical processing.

Q. What do other scholars think of MI theory?

Howard Gardner: There is a wide spectrum of opinion, both within psychology and across the biological and behavioral sciences. Those involved in standard psychometrics

are almost always critical of the theory; among those psychologists who are not psychometricians, there is openness to the expansion of the concept and measurement of intelligence. Still, psychologists like neat measures of their constructs and there is frustration that the "new" intelligences are not as readily measured as the standard ones. Also, psychologists really think of intelligence as 'scholastic capacity' while I am trying to expand the notion of intelligence to extend to all manner of human cognitive capacities.

Scholars are not known for responding generously to new theories, and so I have not been surprised at the considerable criticism leveled at MI theory. Perhaps a more reliable index of reception is the extent to which the theory is cited in scholarly articles and textbooks.

(Also gratifying) has been the response by scholars in the "harder" sciences (such as biology) on the one hand, and in more distant fields (such as the arts and humanities) on the other. The idea of multiple intelligences has considerable appeal across the disciplines, and my particular choice of intelligences is often endorsed.

Q. Do you think we should be able to freely choose what courses we take? Or do you favor a uniform curriculum for all students?

HG: In general at the secondary level, everyone should study some history, science, mathematics, and the arts. It is not important to me which science is taught—I am much more interested in students learning to think scientifically. Similarly, it does not matter that much which history students learn, though they certainly ought to be acquainted with their own country. What matters is that the student have some sense of how historical studies are carried out; what kinds of evidence are used; how history differs from literature on the one hand, and from science, on the other; why each generation rewrites history and there can never be a definitive history.

Q: You prefer depth over breadth. Do you think students might not learn enough with this approach, and graduate with major gaps in their knowledge? For example, if a history class were to focus deeply on World War I, and thus not have time to cover Vietnam?

HG: It is more important that students learn how to think like a historian, and how historians handle data and draw conclusions. This can only come from in depth study of a manageable number of topics. If the teaching of history were well coordinated throughout K-12, we could certainly learn about all the topics that you mention. The problem now is that a student might study the American Revolution four times and never learn about the French or Russian revolutions at all.

Q: Can you recommend techniques for teachers to identify their students' strengths?

HG: If you want to get to know your students intelligences during the first weeks of school, I have two suggestions: 1. Take them to a children's museum a few times (or some other kind of rich experience like a playground with many kinds of games) and watch them carefully. This will complement what you observe in class. 2. Give a small questionnaire about their strengths to the students themselves and their parents and, if possible, last year's teacher. To the extent that all three report the same strengths and weaknesses, you are on pretty safe ground. I don't trust self reports unless they are corroborated.

Q: How does intelligence relate to creativity?

HG: There are many forms of creativity. Domains involving characteristic combinations of intelligences also exhibit characteristic forms of creativity. So, for example, creativity in physics turns out to be quite different from creativity in poetry or politics or psychology. Generalizations about creativity are destined to be weak;

the devil lies in the details about the creative domain in questions.

One cannot be creative unless one has mastered a domain - that process can take up to ten years. Second of all, creativity probably has more to do with personality than with sheer intellectual power. Individuals who enjoy taking risks, who are not afraid of failure, who are attracted by the unknown, who are uncomfortable with the status quo are the ones who are likely to make creative discoveries. Finally, as stressed by my colleague Mihaly Csikszentmihalyi, creativity should not be viewed simply as a characteristic of an individual. Rather, creativity emerges from the interaction of three entities: 1) the individual, with his given talents, personality, and motivation 2) the domain—the discipline or craft in which the individual is working 3) the field—the set of individuals and social institutions that render judgments about quality and originality.

Q: What about the oft-noted connection between mathematical and musical intelligences?

HG: There is no doubt that individuals who are mathematically talented often show an interest in music. I think that this linkage occurs because mathematicians are interested in patterns, and music offers itself as a goldmine of harmonic, metric, and compositional patterns. Interest, however, is not the same as skill or talent; a mathematician's interest in music does not predict that she will necessarily play well or be an acute critic of the performances of others.

(However the implied link) rarely works the other way. We do not expect of randomly chosen musicians that they will be interested, let alone skilled, in mathematics. There may also be a bias in the kind of music at issue. Those involved in classical music are far more likely to be oriented toward science and mathematics than those involved in jazz, rock, rap, and other popular forms.

These observed correlations and lack of correlation suggests another factor at work. In certain families and perhaps also certain ethnic groups, there is a strong emphasis placed on scholastic and artistic accomplishment. Youngsters are expected to do well in school and also to perform creditably on an instrument. These twin goals yield a population with many youngsters who stand out in math and music. There may be other common underlying factors, such as willingness to drill regularly, an inclination toward precision in

Traditionally, especially in the East, the word 'Intelligence' is associated purely with the ability to master material in school. Historically, though, different abilities have been valued at different points of time. Skills admired in the time of hunter-gatherers, for example, would have been markedly different than those admired during the Renaissance.

dealing with marks on a piece of paper, and a desire to attain high standards. One would have to sample a wide variety of skills—from being punctual to writing cogent essays—before jumping to the conclusion that a privileged connection exists between musical and mathematical intelligence.

Q What happens to multiple intelligences during later life?

HG: In many ways, the multiple intelligences seem a particular gift of childhood. When we observe children, we can readily see them making use of their several intelligences. Indeed, one of the reasons for my enthusiasm about children's museums is their evident cultivation of a plethora of intelligences. Nowadays, the children's museum simply has a better fit with the minds of children than does the average school.

It could be that multiple intelligences decline in importance as well as in visibility. But I believe that quite the opposite is true. As individuals become older, our intelligences simply become internalized. We continue to think differently from one another—indeed, differences in modes of mental representation are likely to increase throughout active life. These differences are simply less manifest to outside observers. Consider, for example, what happens in the average high school or college classroom. The teacher lectures, the students remain in the seats, either taking notes or looking vaguely bored. One might easily infer that actually no processing is going on, or that all the process is linguistic in nature. Individuals may also take all kinds of notes and use disparate aids to study and recall. The recesses of our mind remain private. No one can tell the mind exactly what to do. As I see it, the challenge to the mind is somehow to make sense of experience, be it experience on the street or in the classroom. The mind makes maximal uses of the resources at its disposal—and those resources consist in our several intelligences.

Q How could the multiple intelligences theory positively impact schools around the world?

HG: Briefly, my theory can reinforce the idea that individuals have many talents that can be of use to society; that a single measure (like a high stake test) is inappropriate for determining graduation, access to college, etc.; and that important materials can be taught in many ways, thereby activating a range of intelligences. ■

HOWARD GARDNER ALWAYS HAS A PAGE ON MULTIPLE INTELLIGENCE



MULTIPLE INTELLIGENCES

VERBAL-LINGUISTIC INTELLIGENCE ("WORD SMART")

They display a facility with words and languages. They are typically good at reading, writing, telling stories and memorizing words and dates. They learn best by reading, taking notes, listening to lectures, and discussion and debate. They are also frequently skilled at explaining, teaching and oration or persuasive speaking. Those with verbal-linguistic intelligence learn foreign languages very easily as they have high verbal memory and recall, and an ability to understand and manipulate syntax and structure.

LOGICAL-MATHEMATICAL INTELLIGENCE ("NUMBER/REASONING SMART")

They think conceptually in logical and numerical patterns making connections between pieces of information. Always curious about the world around them, these learners ask lots of questions and like to do experiments. Their skills include problem solving, classifying and categorizing information, working with abstract concepts to figure out the relationship of each to the other, handling long chains of reason to make logical progressions, doing controlled experiments, questioning and wondering about natural events, performing complex mathematical calculations, working with geometric shapes.

VISUAL-SPATIAL INTELLIGENCE ("PICTURE SMART")

They tend to think in pictures and need to create vivid mental images to retain information. They enjoy looking at maps, charts, pictures, videos, and movies.



Their skills include: puzzle building, reading, writing, understanding charts and graphs, a good sense of direction, sketching, painting, creating visual metaphors and analogies (perhaps through the visual arts), manipulating images, constructing, fixing, designing practical objects, interpreting visual images.

BODILY-KINESTHETIC INTELLIGENCE ("BODY SMART")

They tend to express themselves through movement. They can control body movements and handle objects skillfully, and have a good sense of balance and eye-hand co-ordination. (e.g. ball play, balancing beams). Through interacting with the space around them, they are able to remember and process information. Their skills include: dancing, physical co-ordination, sports, hands on experimentation, using body language, crafts, acting, miming, using their hands to create or build, expressing emotions through the body

MUSICAL INTELLIGENCE ("MUSIC SMART")

They think in sounds, rhythms and patterns. They immediately respond to music either appreciating or criticizing what they hear. Many of these learners are extremely sensitive to environmental sounds (such as bird calls, bells, dripping taps). Their skills include: singing, whistling, playing musical instruments, recognizing tonal patterns, composing music, remembering melodies, understanding the structure and rhythm of music.

INTERPERSONAL INTELLIGENCE ("PEOPLE SMART")

They try to see things from other people's point of view in order to understand how they think and feel. They often have an uncanny ability to sense feelings, intentions and motivations. They are great organizers, and try to maintain peace in group settings and encourage co-operation. Their skills include: seeing things from other perspectives (dual-perspective), listening, empathising, counseling, co-operating with groups, communicating verbally and non-verbally, building trust, peaceful conflict resolution, establishing positive relations with other people.

INTRAPERSONAL INTELLIGENCE ("SELF SMART")

They try to understand their inner feelings, dreams, relationships with others, and strengths and weaknesses. Their skills include: Recognizing their own strengths and weaknesses, reflecting and analyzing themselves, awareness of their inner feelings, desires and dreams, evaluating their thinking patterns, reasoning with themselves, understanding their role in relationship to others.

NATURALIST INTELLIGENCE ("NATURE SMART")

They are excellent at recognizing and classifying both the animal and plant kingdoms, as well as showing understanding of natural phenomena. Their highly-developed levels of sensory perception may help them notice similarities, differences and changes in their surroundings more rapidly than others. Skills include observing, collecting, categorizing and cataloguing things from nature.

ART FOR OUR SAKE



School arts classes matter more than ever,
but not for the reasons you think.

By Ellen Winner and Lois Hetland

Why do we teach the arts in schools? In an educational system strapped for money and increasingly ruled by standardized tests, arts courses can seem almost a needless extravagance, and the arts are being cut back at schools across the country.

One justification for keeping the arts has now become almost a mantra for parents, arts teachers, and even politicians: arts make you smarter. The notion that arts classes improve children's scores on the SAT, the MCAS, and other tests is practically gospel among arts-advocacy groups. A Gallup poll last year found that 80 percent of Americans believed that

learning a musical instrument would improve math and science skills.

But that claim turns out to be unfounded. It's true that students involved in the arts do better in school and on their SATs than those who are not involved. However, correlation isn't causation, and an analysis we did several years ago showed no evidence that arts training actually causes scores to rise.

There is, however, a very good reason to teach arts in schools, and it's not the one that arts supporters tend to fall back on. In a recent study of several art classes in Boston-area schools, we found that arts programs teach a specific set of thinking skills rarely addressed elsewhere in the curriculum



- and that far from being irrelevant in a test-driven education system, arts education is becoming even more important as standardized tests like the MCAS exert a narrowing influence over what schools teach.

The implications are broad, not just for schools but for society. As schools cut time for the arts, they may be losing their ability to produce not just the artistic creators of the future, but innovative leaders who improve the world they inherit. And by continuing to focus on the arts' dubious links to improved test scores, arts advocates are losing their most powerful weapon: a real grasp of what arts bring to education.

It is well established that intelligence and thinking ability are far more complex than what we choose to measure on standardized tests. The high-stakes exams we use in our schools, almost exclusively focused on verbal and quantitative skills, reward children who have a knack for language and math and who can absorb and regurgitate information. They reveal little about a student's intellectual depth or desire to learn, and are poor predictors of eventual success and satisfaction in life.

As schools increasingly shape their classes to produce, high test scores,

many life skills not measured by tests just don't get taught. It seems plausible to imagine that art classes might help fill the gap by encouraging different kinds of thinking, but there has been remarkably little careful study of what skills and modes of thinking the arts actually teach.

To determine what happens inside arts classes, we spent an academic year studying five visual-arts classrooms in two local Boston-area schools, videotaping and photographing classes, analyzing what we saw, and interviewing teachers and their students.

What we found in our analysis should worry parents and teachers facing cutbacks in school arts programs. While students in art classes learn techniques specific to art, such as how to draw, how to mix paint, or how to center a pot, they're also taught a remarkable array of mental habits not emphasized elsewhere in school.

Such skills include visual-spatial abilities, reflection, self-criticism, and the willingness to experiment and learn from mistakes. All are important to numerous careers, but are widely ignored by today's standardized tests.

In our study, funded by the J. Paul Getty Trust, we worked with classes at the Boston Arts Academy, a public school in the Fenway, and the private Walnut Hill School for the arts in Natick. Students at each school concentrate on visual arts, music, drama, or dance, and spend at least three hours a day working on their art. Their teachers are practicing artists. We restricted ourselves to a small sample of high-quality programs to evaluate what the visual arts could achieve given adequate time and resources.

Although the approach is necessarily subjective, we tried to set the study up to be as evidence-based as possible. We videotaped classes and watched student-teacher interactions repeatedly, identifying specific habits and skills, and coding the segments to count the times each was taught. We compared our provisional analysis with those the teachers gave when we showed them clips of their classes. We also interviewed students and analyzed samples of their work.

In our analysis, we identified eight "studio habits of mind" that arts classes taught, including the development of artistic craft. Each of these stood out from testable skills taught elsewhere in school.

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One of these habits was persistence: Students worked on projects over sustained periods of time and were expected to find meaningful problems and persevere through frustration. Another was expression: Students were urged to move beyond technical skill to create works rich in emotion, atmosphere, and their own personal voice or vision. A third was making clear connections between schoolwork and the world outside the classroom: Students were taught to see their projects as part of the larger art world, past and present. In one drawing class at Walnut Hill, the teacher showed students how Edward Hopper captured the drama of light; at the Boston Arts Academy, students studied invitations to contemporary art exhibitions before designing their own. In this way students could see the parallels between their art and professional work.

Each of these habits clearly has a role in life and learning, but we were particularly struck by the potentially broad value of four other kinds of thinking being taught in the art classes we documented: observing, envisioning, innovating through exploration, and reflective self-evaluation. Though far more difficult to quantify on a test than reading comprehension or math computation, each has a high value as a learning tool, both in school and elsewhere in life.

The first thing we noticed was that visual arts students are trained to look, a task far more complex than one might think. Seeing is framed by expectation, and

The first thing we noticed was that visual arts students are trained to look, a task far more complex than one might think. Seeing is framed by expectation, and expectation often gets in the way of perceiving the world accurately.

expectation often gets in the way of perceiving the world accurately. To take a simple example: When asked to draw a human face, most people will set the eyes near the top of the head. But this isn't how a face is really proportioned, as students learn: our eyes divide the head nearly at the center line. If asked to draw a whole person, people tend to draw the hands much smaller than the face - again an inaccurate perception. The power of our expectations explains why beginners draw eyes too high and hands too small. Observational

drawing requires breaking away from stereotypes and seeing accurately and directly.

We saw students pushed to notice what they might not have seen before. For instance, in Mickey Telemaque's first design class of the term at the Boston Arts Academy, ninth-graders practice looking with one eye through a cardboard frame called a viewfinder. "Forget that you're looking at somebody's arm or a table," Telemaque tells his students. "Just think about the shapes, the colors, the lines, and the textures." Over and over we listened to teachers telling their students to look more closely at the model and see it in terms of its essential geometry.

Seeing clearly by looking past one's preconceptions is central to a variety of professions, from medicine to law. Naturalists must be able to tell one species from another; climatologists need to see atmospheric patterns in data as well as in clouds. Writers need keen



observational skills too, as do doctors.

Another pattern of thought we saw being cultivated in art classes is envisioning - forming mental images internally and using them to guide actions and solve problems. "How much white space will you be leaving in your self-portrait?" asked Kathleen Marsh at the Boston Arts Academy. "How many other kinds of orange can you imagine?" asked Beth Balliro, also at the Boston Arts Academy, as she nudged her student to move beyond one shade. We noticed art teachers giving students a great deal of practice in this area: What would that look like if you got rid of this form, changed that line, or altered the background? All were questions we heard repeatedly, prompting students to imagine what was not there.

Like observing, envisioning is a skill with payoffs far beyond the art world. Einstein said that he thought in images. The historian has to imagine events and motivations from the past, the novelist an entire setting. Chemists need to envision molecular structures and rotate them. The inventor - the envisioner par excellence - must dream up ideas to be turned into real solutions. Envisioning is important in everyday life as well, whether for remembering faces as they change over time, or for finding our way around a new city, or for assembling children's toys. Visualization is recognized as important in other school subjects: The National Council of Teachers of Mathematics and the National Science Education Standards both see it as essential to problem-solving, but art classes are where

We also found innovation to be a central skill in art classes. Art classes place a high value on breaking the mold. Teachers encourage students to innovate through exploration - to experiment, take risks, and just muck around and see what can be learned.

this skill is most directly and intensively taught.

We also found innovation to be a central skill in art classes. Art classes place a high value on breaking the mold. Teachers encourage students to innovate through exploration - to experiment, take risks, and just muck around and see what can be learned. In ceramics, for example, capitalizing on error is a major consideration, says Balliro at the Boston Arts Academy. To a student struggling to stick clay together, she says, "There are specific ways to do it, but I want you guys to play around in this first project. Just go

with that and see what happens and maybe you'll learn a new technique." Teachers in our study told students not to worry about mistakes, but instead to let mistakes lead to unexpected discoveries.

Finally, many people don't think of art class as a place where reflection is central, but instead as a place where students take a break from thinking. But art-making is nonverbal thinking, and verbal thinking (often public and spoken) is a focal activity of arts classes. We repeatedly saw art teachers push their students to engage in reflective self-evaluation. They were asked to step back, analyze, judge, and sometimes reconceive their projects entirely.

During class critiques, and one-to-one as students worked, teachers asked students to reflect: Is that working? Is this what I intended to do? Can I make this better? What's next? At Walnut Hill School, Jason

ART FOR OUR PACE: ELIZABETH HARRIS/ARTS EDUCATION

Green questioned individual students almost relentlessly as they began a new clay sculpture: "What about this form? Do you want to make the whole thing? Which part of it?" In group critiques, students also learned to evaluate the work of their peers. Making such judgments "in the absence of rule" is a highly sophisticated mental endeavor, says Elliot Eisner, a noted art-education specialist at Stanford University.

Though we both have a long history in arts education, we were startled to find such systematic emphasis on thinking and perception in the art classes we studied. In contrast to the reputation of the arts as mainly about expressive craft, we found that teachers talked about decisions, choices, and understanding far more than they talked about feelings.

By unveiling a powerful thinking culture in the art room, our study suggests ways that we can move beyond the debate over the value of arts, and start using the arts to restore balance and depth to an education system increasingly skewed toward readily testable skills and information.

While arts teachers rightly resist making their classes like "academic" classes, teachers of academic subjects might well benefit from making their classes more like arts classes. Math students, for instance, could post their in-process solutions regularly and discuss them together. If students worked on long-term projects using primary sources in history class, they would learn to work like real historians and their teachers could offer personalized and "just in time" guidance.

Despite the pressures to prepare students for high-stakes tests, some teachers and schools continue to use methods similar to those in the art studio. Ron Berger, a fifth-grade classroom teacher in a public school in Shutesbury, Mass., provides an inspiring example. He adopted an arts-like approach to all subjects, including math, language arts, science, and social studies. His students engage in long-term investigations rather than one-shot assignments or memorization. Their work is continually assessed publicly in critiques so students develop the ability to reflect and improve. Projects are "real work," not "school work" - work that is original and makes a contribution to knowledge.

For example, students investigated the purity of drinking water in their town wells, working in collaboration with a local college and learning how to analyze the water in a college lab. No one in the town knew whether the well waters were safe, and the students discovered and reported that they were

Deborah Meier, a leading American school reformer and founding principal of the Mission Hill School in Boston, praises Berger's teaching. She worries that "Top-down mandates may actually hinder this kind of culture of high standards."

We don't need the arts in our schools to raise mathematical and verbal skills - we already target these in math and language arts. We need the arts because in addition to introducing students to aesthetic appreciation, they teach other modes of thinking we value.

For students living in a rapidly changing world, the arts teach vital modes of seeing, imagining, inventing, and thinking. If our primary demand of students is that they recall established facts, the children we educate today will find themselves ill-equipped to deal with problems like global warming, terrorism, and pandemics.

Those who have learned the lessons of the arts, however - how to see new patterns, how to learn from mistakes, and how to envision solutions - are the ones likely to come up with the novel answers needed most for the future. ■

Ellen Winner (L) is a professor of psychology at Boston College. **Lois Hetland** (R) is an associate professor of art education at the Massachusetts College of Art. Both are also researchers at Project Zero at the Harvard Graduate School of Education and co-authors, with Shirley Veenema and Kimberly Sheridan, of "Studio Thinking: The Real Benefits of Visual Arts Education," published Teachers College Press.



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ART PHOTOGRAPH BY ELLEN WINNER AND LOIS HETLAND



do you have a mindfields story to share?

- Do you know a person whose work in the realm of education merits celebration?
- Do you know a school that fosters individual thinking, that is unafraid of taking the less beaten path?
- Do you know a teacher whose work and spirit make for sparkling classroom interactions?
- Are you a creative individual – scientist, historian, artist, poet, musician, writer - who knows how to cut through the jargon and talk about your work to lay people?
- Do you have an anecdote about an insightful, heartwarming interaction with a student or child?

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We will be happy to have your suggestions and contributions translate into interviews, features, comic strips in our future issues.

Contributors will receive a honorarium and a free year-long subscription to Mindfields.



Seen here with son Benjamin, Howard Gardner (Centre) and Ellen Winner (Right) will be on a speaking tour to India organised by iDiscover! XSEED in January 2012. Read more about Howard Gardner India tour in page 4.

"In my own work, I'm a proponent of teaching for understanding, which means going deeply into topics so that students can really make use of knowledge in new situations. This is very, very different from most teaching, where people memorize material and can reproduce it on demand but can't make use of it in new situations. That's what understanding entails. If you favor education for understanding the way I do, then MI can be extremely helpful. Because when you are teaching a topic, you can approach the topic in many ways, thereby activating different intelligences." Remarkd Dr. Gardner in a 2008 interview by Kecnan Wellar.

Dr. Gardner is extremely prolific and has written over 25 books and numerous articles and papers on education as well as on other general interest topics.

He is the John H. and Elisabeth A. Hobbs Professor

of Cognition and Education at the Harvard Graduate School of Education. He also holds positions as Adjunct Professor of Psychology at Harvard University and Senior Director of Harvard Project Zero.

He has received many honours including a prestigious MacArthur Prize Fellowship in 1981. He has also received honorary degrees from 26 colleges and universities, including institutions in other countries Bulgaria, Chile, Greece, Ireland, Israel, Italy, and South Korea. He also holds positions as Adjunct Professor of Psychology at Harvard University. He was a founding member and director of Harvard Project Zero, an educational research group housed at the Harvard Graduate School of Education focusing on cognition and the arts.

His research in the past two decades has gone far beyond intelligence, with projects on creativity, leadership, professional ethics, and trust, including an ongoing project that looks at ethical decisions that young people make in cyberspace, how the new digital media are affecting young people's cognitive capacities, dispositions, and ethical senses. Gardner argues that it is far more complex, but still possible, to approach truth, beauty, and goodness in a digital era, but its pursuit should be anything but automatic.

This special issue is a preview to Dr. Gardner's India tour in January 2012 and celebrates his contribution to the world of learning by presenting to you a selection of his writings.

Luke Haokip

Gaedner's third argument with Piaget—the deepest one—had to do with the most interesting claim that Piaget made, that children pass through stages of cognitive development. Which basically posited that infants know the world in one way, five-year-olds in another way, ten-year-olds in another way, and fifteen-year-olds in still another way. Part of this developmental sequence is that when you go from nine to eleven or from thirteen to sixteen years not only do you see the world in a very different way, you can't even remember how you used to see the world.

So at age seven you don't believe that you ever thought that if a ball of clay was squished, there was less clay there; or that if water were poured into a different kind of vessel, there will be more or less water depending on the shape of the vessel. Even though every four-year-old in the world believes that.

Where Gardner feels Piaget was wrong was in his argument that when people get older they see the world in a different way and they no longer have access to earlier ways of knowing.

Gardner argues that most of us, except in areas where we are expert, continue to think the way we did when we were five years of age. We continue to think the way we did before we went to school, which is a pretty radical thing to say. But to figure out what is understanding and how can we determine whether understanding has been achieved is a much more difficult proposition.

Gardner defines understanding as the capacity (knowledge, skills, concepts, facts) learned in one context, usually the school context, and used in a new context in a place where you haven't been forewarned that you should make use of that knowledge.

If you were only asked to use knowledge in the same situation in which it was introduced, you might understand, but you might not; we can't tell. But if something new happened out in the street or in the sky or in the newspaper, and you can draw on your earlier knowings, then you understand.

In his book, *The Unschooled Mind*, there is a section on the 1991 Gulf War that

provided brilliant examples in America of not understanding at the highest levels. In history, in political science, in economics and in physics, there were rampant examples of misunderstanding.

Gardner introduces his approach with three common-sense examples.

Example 1. In the first five years of life, children all over the world, with very little formal schooling, learn to speak, to understand, to tell stories, to tell jokes, to draw, to sing, to invent new tunes, to engage in pretend play—all the things that Piaget and other psychologists demonstrated. Even though nobody knows how to teach these things, kids learn them all.

Then they go to school, to the very place

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where we are supposed to know how to teach them, and suddenly learning becomes very hard and many of them do not do well. That is a paradox and an enigma.

Example 2. Students at the best universities in the United States (like MIT and Johns Hopkins), with very high grades in physics, leave their class and are given a problem to solve on the street, or a game to play, that involves various physical principles. Not only do they fail to use what they learned in school but they actually answer in the same way that five-year-olds do, or for that matter in the way pre-Aristotelians and Aristotelians did.

Example 3. Gardner's daughter, an otherwise excellent student, once called

him up when she was a sophomore in college. She was crying on the telephone. She said it was because she could not understand physics. "It's my physics; I don't understand it," she said. Gardner tried to pacify her by telling her he really respected her for taking physics because it's difficult and he himself wouldn't have taken it in college. He told her that he didn't care what grade she got, but that it was really important that she understand physics.

He told her to go to her instructor and have him explain to her what it is that she couldn't understand. Exasperated, she exclaimed, "dad, you don't get it! I've never understood." This had a profound impact on Gardner. His daughter was not saying that she was a faker or a "poseur". What she was saying is something most of us experience—we know the moves to make in school, to get good grades and even to be successful, but we also know that if people put the questions to us in another way, if they push to see how much we have really understood, the whole house of cards might fall.

Obstacles to Understanding

- Short-answer assessments or Gardner calls a "text test context". The test is based on a textbook and the textbook tells you the answers you have to give.
- The correct answer compromise is an "entente" between the teacher and the student. If you respond this way, nobody should ask any further question. No one is made uncomfortable, but deeper understanding is avoided.
- The pressure for coverage: there are 37 chapters in the book and you must get through all 37 chapters.

So, we have three vignettes. The young child learns so easily; the school child has difficulty. The students who get "A's" at the best universities in the world are still Aristotelians in their models of the physical world. What is going on here? Gardner calls it cognitive Freudianism.

Freud convinced people that, as adults, we continue to have the same personality traits as when we were children. We fight the same battles we fought with our parents and our siblings. Gardner says, "Most people who live in a modern western

society believe this. "If you don't believe it and you pay me US\$100 an hour, I will convince you that it is true," he adds. "That is what psychoanalysis is all about. I'm making the claim that Freud was correct in an area that he wasn't expert in, but Piaget was." Gardner claims most of us continue to think the way we did when we were five years of age, except in areas where we are experts.

Gardner analysis of why it is so difficult to go beyond the five-year-old mind has three focuses, first the young natural learner: the 3, 4 or 5-year-old who speaks so much about the world without any formal schooling. Then there is the student who basically masters everything the school requires so he or she can get to the next level but he doesn't really understand. Then there is the person who can use knowledge in new situations, the expert.

There is a form of knowing (theory of knowledge) that goes with each of these three focuses. The expert is a person who can use the skills that are valued in his or her culture in context. So when a historical example comes up, he can draw on history; when a physical example comes up he can draw from physics, and so on. That is what we want; that is why we go to school. If people are not going to be able to use the knowledge we may as well close schools down. Scholastic knowledge is what we are very good at doing in school; but unless that scholastic knowledge can be activated in new circumstances it remains inert and essentially useless.

We teach people notations, squiggles on paper, formal concepts like what is gravity, what is density, what is force... People who have no sense of what it is like in the world can give you a formula and a definition if that's what is called for in class.

Then, there are epistemic forms. Epistemic forms relates to how the people think in the different disciplines because to think like a historian is not the same as to think like a literary critic or a biologist.

This is what school is supposed to do. But in the first years of life a natural learner benefits from what Piaget so brilliantly described: sensory motor knowledge, learning about the world, using your hands and your eyes, exploring the world of objects, the world of liquids poured from one container to another what Gardner calls first-order symbolic competence. People use words, pictures and gestures, to communicate meanings. That is what every five-year-old can do.

That is the good part. However, five-year-olds do one thing that is troublesome: they form intuitive conceptions or theories—theory of matter, theories of mind, theories of life. Every normal five year-old develops these theories. And it is very good for getting along in the world. However, the theories are wrong. School is supposed to

replace the erroneous theories with better theories.

So what is a theory of matter? A theory of matter is: if I have a heavy object in this hand, a light object in this hand and I release them at the same time, the heavier one will fall more quickly. That is what you learn intuitively. Heavy things fall more quickly. However, Galileo went to the tower of Pisa, dropped two objects, and since then we understand that that is not in fact what happens. We understand that the laws of acceleration are independent of weight. But as children we develop a very powerful theory of matter and that is very hard to shake.

Here is a theory of life: every five-year-old believes that if it is moving, it is alive; if it is not moving, it is dead. This is a very useful theory. However sleeping dogs, and computers are a real problem. Are computers that display moving images alive or dead? It is very hard to say.

A theory of mind is very relevant, I've got a mind; you've got a mind. If we look alike then our minds are the same. If we don't look alike, our minds are different. If you look

like me, you've got a good mind; if you don't look like me, you've got a bad mind. This is a very powerful theory that is very well entrenched in our minds. It shows up in all kinds of places. Just turn on the television for evidence. It is this that education is supposed to deal with, and it is this, Gardner maintains, that education has, by and large, failed to deal with. These are again just the scholastic acquisitions.

Why does this happen? Gardner claims it happens because there are different kinds of constraints operating on us.

Constraints Operating on Us

The first constraint has to do with the kind of species we are. We learn certain things very easily. We develop certain theories very readily, and other ones are

extremely hard for us to develop. Why this should be the case is a whole interesting evolutionary question.

Then there are institutional constraints. If you put 50 people in a room like this and one person in front of them, it is very hard to explain things so that all 50 people can understand; for every person who is nodding, three are nodding off.

There are also disciplinary constraints. The moves that have been developed over the centuries for analysis in one discipline are very different from the moves in other disciplines. Physical causality is not like historical causality or literary causality.

These constraints contribute to the problem being described.

Gardner, however, feels there's hope.

The hope lies in two institutions. One of them, the apprenticeship, is very old. There are many powerful clues

If people are not going to be able to use the knowledge we may as well close schools down. Scholastic knowledge is what we are very good at doing in school; but unless that scholastic knowledge can be activated in new circumstances it remains inert and essentially useless.

about how to educate for understanding offered in the apprenticeship. The second is a new institution, more familiar in the United States than in most other countries, though it is spreading rapidly: the children's museum, or the science museum, or the discovery museum, or, for those of you who have been to San Francisco, the Exploratorium. There are very powerful education implications in those two institutions.

The natural learner displays intuitive understanding. He or she is very promiscuous with the theories already developed in the young mind. Whenever anything happens, the young child draws on the theories of mind, matter and life, to explain them, whether or not those theories are appropriate at all.

The scholastic learner never tries to apply the theory anywhere, except where he or she is told to. It is exactly the opposite of the natural learner. So the scholastic learner gives a ritualized performance. The teacher asks the question, the student gives the prescribed answer or they are told that they are wrong, and you go on to the next student.

The disciplined learner, the expert, on the other hand produces a discipline of understanding: not only can he or she draw on knowledge when it is appropriate but, equally important, does not draw on that knowledge when it is not appropriate.

The five-year-old is too promiscuous and uses the knowledge all the time. The ten-year-old is repressed (the opposite of being promiscuous) and almost never uses it. But the person with disciplined understanding has good taste and uses the knowledge just when it is appropriate. This comes about because there are constraints, also gaps.

According to Gardner there are some deep and epistemological reasons why it is very difficult to teach for understanding.

If we take "Cook's Tour" of the different disciplines we will see that this is not a problem just for somebody else's discipline; it is a problem for every discipline.

Problem with Physics. Most people remain five-year-olds or Aristotelians even though they studied physics. There is

a wonderful example, twenty-five Harvard students have just graduated, all wearing their gowns and their mortar boards. An interviewer says to the students: "Tell me, why is the earth warmer in the summer than it is in the winter?" Twenty-three out of the 25 students immediately came up with the same answer, the answer that you would come up with if you did not know what I was lecturing about: namely that the earth is closer to the sun in the summer than it is in the winter. Now if we think about it, that does not make any sense because it would not account for the seasons in different parts of the world. The right explanation has to do with the angle of the earth on its axis as it makes its rotations. But 23 out of 25 students forget to apply what they have learned in their astronomy classes and give the same five-year-old kind of answer.

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Problem with Biology

Research shows that students, who have as many as two or three courses in biology focusing on the topic of evolution, still do not understand the basics of evolution. They still believe that something in one generation can be passed on to the next, even if it was acquired in that generation. They are also still perfectionists. They think that each organism is trying to get more perfect and there is an unseen hand that is guiding that perfection rather than simply variation and selection within a particular ecological niche. So problems in physics extend to biology and to the other sciences as well.

Problem with Mathematics

Mathematics is all abstract. It has nothing to do with the real world. So maybe people do not have misconceptions in the

area of mathematics. What they have instead is what Gardner call rigid algorithms. They learn to fill in numbers into a formula.

This is the problem. There are six times as many students as professors. If there are ten professors, how many students are there? The answer is 60. But if you were asked to capture the above information in a written equation where S stands for students and P stands for professors, most people will write the following equation: $6S=P$. This is because if you analyze the sentence it says there are six times as many students as there are professors. However what they are actually writing is "six times sixty equals ten" which is clearly an absurd result.

What happens in mathematics is that students learn how to plug numbers into formulas, how to solve equations. As long as the information is presented to them in a certain canonical order, they will get the answer right. If, however, the problem is presented in a new way, in a way that actually describes understanding of the formalism, most people will not get it right because they will not understand the formalism.

"I can think back to my own education. I studied the quadratic equation and I must have solved 500 problems with the quadratic equation. I'm sure by the time I finished school, I could do the quadratic equation in my sleep. Never did anybody give me any education of what a quadratic equation stood for. Nowadays if I ran into a problem I wouldn't have a clue that it involved the quadratic equation, even though I might, on a dark and stormy night, remember what a quadratic equation was. But I got very good grades in mathematics because I wasn't expected to know where to use this kind of formalism," rues Gardner.

So, the problem in science is misconceptions. The problem in mathematics is rigidly applied algorithms.

Problem in the Arts, in the Humanities

In the arts and the humanities the problem is different. Gardner calls it **scripts or stereotypes**. Early on in life children develop very powerful theories about the world. A favourite script is the restaurant script. Every four-year-old knows that if you go to a restaurant,

somebody comes and seats you. You are given the menu; you order. Food comes. You eat it and then you call for the cheque, and you leave.

If you go to McDonald's you pay first but that is an exception to the script. Every four-year-old also knows about birthday parties: who comes, what you serve, that kind of thing. The rules are different in different cultures but everybody knows about birthday parties.

Actually, the best example of the unschooled mind in the arts comes from the university of Cambridge in the UK. In the 1920s a literary critic and poet named I.A. Richards did a study of Cambridge undergraduates. He published it in a book titled *Practical Criticism*. He took Cambridge undergraduates who were the best and brightest literary students. He gave them twelve poems and he asked them two questions about the poems. What do they mean? Are they any good?

What did he find? He found that the students did not have a clue about which poems were good (according to the critics) and which were bad. They rejected John Donne. They rejected Gerald Manley Hopkins. They embraced a Sunday poet who couldn't get into the "Cambridge Chronicle" and, when they were asked what accounted for the quality, they replied: if a poem rhymed, scanned, dealt with a pleasant subject, but was not too sentimental, it was good. But if it dealt with philosophy or anything tragic or anything abstract, it was bad. So, here you have very, very good students who have studied literature, who, when the book or poem credit is removed display the same kind of taste that someone with no education in literature would exhibit.

So, essentially what Gardner is to doing is arguing that in every area of the curriculum we have real problems that reveal how difficult it is to educate for understanding. We have misconceptions in the sciences, rigidly applied algorithms in mathematics and scripts and stereotypes in social studies, humanities and the arts.

For Gardner one source of hope is intaking some lessons from the old institution of apprenticeships and the new institution of children's museums.

People usually misunderstand Gardner and think he's taking about instituting practices like seven-year agreements between the apprentice and the master where the apprentice is indentured and has to sweep the floor and that kind of thing, or that we should close schools down in an Ivan Illich sense and put everybody in children's museums. That is definitely not what he means.

That there are very powerful educational messages in these two institutions that can help educate for understanding. In the case of the apprenticeship, a young person works

for someone who is the master of his or her discipline or craft, and who uses that discipline or craft every day in the course of genuine problem solving. The master poses the problems and requires products from the apprentice at his or her level of competence; when the apprentice becomes more competent then the standards are raised.

The master never has to take kids and test them at the end of the week, or the end of the year because, essentially he and the student are assessing every day. Moreover the master embodies the learning that he or she wants the child to have.

In the United States, every teacher can read and write but very few of our elementary school teachers actually do read and write. In fact, in a very alarming statistic, the average American school teacher reads one book a year. People who live in a literate world who read and write and talk about what they are reading and writing will have youngsters who do the same. People who simply say you should read but turn on the TV for seven hours give a very different message.

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As far as the children's museum is concerned this is a very new invention. Basically, until 25 years ago, there were almost no children's museums. But these are places that contain very lively demonstrations of many of the principles that students learn about in school, across the curriculum.

They allow children to explore those principles, those ideas, at their own pace and in ways that are comfortable for that child. Frank Oppenheimer, who founded the Exploratorium in San Francisco, said: "Nobody flunks museum." It is a very powerful idea.

Garner remarks, "I became a devotee of children's museums because when I took kids to children's museums I often found that kids who were called bright in school could not find their way around. They were very unschooled. But kids who were not considered bright in school could often learn very well in those contexts. I will explain later why that is very important."

In the case of misconceptions, if you believe the world is flat, but every day or every year you travel around the world and you come back to where you started before, that tends to belie the notion that the world is flat. In a Christopherian encounter you expose your theories to disconfirmation. If your theories are consistently disconfirmed, you will slowly abandon them, and hopefully construct a better one.

Most school kids believe that the reason that you are warm when you put on a sweater, is because that sweater has warmth in it. If every year, in school during the winter, you put a sweater outside and you come in the morning and find it is freezing cold, that tends to disconfirm the notion

that there is warmth inherent in the sweater.

Christopherian encounters have to happen over and over again. To use an analogy: think about the brain with a mind as a surface that, earlier in life, becomes very much engraved with these primitive theories. What school usually does is simply put some powder over that engraving so you can't see it. And as long as you are in school, it is the powder that you notice. When you leave school, and you slam the door, the powder puffs up and the engraving is still there, the early theory. What happens in the Christopherian encounter is that you slowly upgrade that early engraving and you etch a new and better one.

"But you can see that it doesn't happen in one time. Let me tell you what is wrong with the 'one time' thing. If you ask my son Benjamin, who is now all of seven years old, what's the shape of the world, he will tell you it is round. This makes you think he is very smart. But if you asked Benjamin where he is standing he will say: 'That's easy. I'm on the flat part underneath.' His theory has been totally unaffected but he has learned the powder that is required, basically if you want to shut up your father, you say that the world is round because that's what grownups say, but who could believe it?" Says Gardner.

Thus Christopherian encounters challenge those notions every day. In mathematics, the cure for a rigidly applied algorithm is what Gardner calls rich exploration of the relevant semantic domain. What that means in English is that you must know what the equation stands for.

You have to understand the formalism. So if you are going to do distance, rate and time problems—a common algebra exercise—you do a lot of experimenting. You try to predict how long it will take for something to get from one point to the other. You develop an intuition for the formalism so that when you learn the formalism it actually refers to something that you already have an intuition for, that you already have an understanding for.

This has been done quite brilliantly with calculus where, before any of the formalism is introduced, kids learn to make predictions about their bodies

moving at various speeds and what kind of graphs would be produced over the course of time, and things like that.

A mathematician is not somebody who remembers all the formalisms. A mathematician is somebody who doesn't care if he remembers because, if necessary, he/she can derive it again because he/she understands what it stands for. That is why most of us are not mathematicians.

In the case of the humanities, the cure for stereotypes is the regular adoption of multiple stances. If it becomes a regular habit of mind to look at things from many different points of view, you will gradually abandon stereotypical thinking.

During the Gulf war, my older son went to school where there were kids from

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many different countries. The teacher had a very good idea. Rather than everybody just giving what the cable news network reported, he had a student from Iran, and a student from Kuwait, and a student from Israel etc, give their understanding of what was happening every day. Then, a few weeks after that, the teacher asked the kids in the school: "What do you think Moshe will think about this and what do you think Omar will think about this?" That is giving students the opportunity to put themselves into other people's minds.

If you study any revolution, from the point of view of the vanquished as well as the victors, you get a very different story. If you study the American revolution from the point of view of the British, where it was a colonial uprising, and from the

point of view of the French, where it was a good opportunity to get at the British, it is a very different story than if you just read the average American text book. That is how you break down stereotypical thinking, but it has to be a regular habit of mind, otherwise it won't work at all.

Gardner is involved in a project, which is actually designed to educate for understanding. It is based upon three core ideas that he has worked out in conjunction with some colleagues at Harvard:

- The identification of rich, generative ideas; nutritious topics on which it is worth spending a lot of time;
- The development of different kinds of teaching languages—multiple ways to approach those topics, so we can be sure that students have maximum access to those ideas; and
- What he calls "ongoing assessment". Ongoing assessment (or "assessment in context") means assessment is taking place all the time by students and by peers as well as by the teacher.

Gardner believes that if one can identify rich ideas, explore them in multiple ways and give students much opportunity to assess their own learning, that there then is a chance for education for understanding.

Fleshing Out Abstract Ideas

According to Gardner the greatest enemy of understanding is coverage. If you are determined to cover everything in the book, you virtually guarantee that very few students will understand. So, if you want to educate for understanding you have got to make tough choices about what to focus on.

And obviously you should focus on those things that have the biggest milcage. If you are teaching a course in history or social studies and you decide, say, to focus on democracy, or if you are teaching a course in biology and you choose to focus on evolution, you can cover a lot of the important material in those subjects by focusing on those topics. It will mean, however, that if you are doing history you are not going to get through every decade. If you are doing biology, you are not going to get through every cycle or through

every part of the cell, or every part of the tree. It's a hard choice, but we think it is a choice worth making. If you have rich concepts and you spend time on them, you can approach them in different ways.

"Growing out of my theory of multiple intelligences, I claim that almost any topic that is worth spending time on can be approached from at least five different "windows" into the same room.

1. **Narrational**—or the story mode.
2. **Quantitative**, logical rational way of dealing with numbers, principles, causality.
3. **Foundational** way, asking very basic kinds of questions such as: Why is this important? How does it relate to what came before? How is it related to today?
4. **Aesthetic**—What does it look like? What does it sound like? What appearance does it make? What patterns and configurations? How does it impress you?
5. **Hands On**—What is it actually like to be this thing, to do this thing? If you are studying evolution, what is it like to breed drosophila? If you are studying democracy, what is it like to be in a group that decides by consensus as opposed to one that decides by autocracy, oligarchy or some other political principle?

There are two advantages of using these multiple entry points.

First of all, you are more likely to reach every child, because not every child learns most easily in the same way. That is one of the burdens of the theory of multiple intelligences, which you've been spared today, but I believe that kids have different ways of learning.

Second of all, and equally important, if you approach a topic from many different vantage points you are modelling for a student what it is like to be an expert. Because an expert is always somebody who can represent knowledge in more than one way. No expert can think about his or her topic in only one way. Experts have very flexible ways of thinking about their topics and that is what you are modelling as a master to your apprentices if you approach a topic in a number of different ways.

Assessment

In what we call authentic assessments, we get very far away from short-answer examinations, which are particularly a plague of the USA, to what I call performance-based exams where you actually demonstrate what it is that you are supposed to be able to do. Only in the USA would there be a conviction that, if you want to know how somebody can write, rather than ask him to write, you ask him to fill in the blanks. But other things that you have heard of—projects,

exhibitions, portfolios and what Gardner calls "process folio" which is not just your finished work, but actually your drafts and your thinking en route to fashioning a product—are good ways of assessing whether the students are really understanding.

In the work that Gardner and his team are doing on this project on understanding they work with teachers in local schools and we ask them first to define what we call "understanding goals"—these are the broad things that we want to achieve in a course. They will be very familiar things to you, like having a sense of the scientific method or understanding something about the nature of revolution.

What they then do, which may not be so familiar, is define a whole family of "understanding performances"—these are performances that, if a student can carry them out, will count as evidence for understanding.

This is a play with language, but it is an important play, because people tend to think of understanding as something that happens in the head. We say, maybe it does but we don't know whether you understand unless you can perform your understanding publicly. So, your performance involves analyses, critiques, debates, projects that you create, exhibitions that you put on, things like that.

Finally, given the "understanding goals" and the "understanding performances", how are those performances going to be assessed? You have to make the assessment criteria absolutely clear. People know exactly what they are going to have to be able to do in order to perform an understanding. There are no surprises, no mysteries, no key to the answers, but rather examples all around of what a good performance is and what are not such good performances, from

apprentice level all the way to that of a master.

Gardner says he has talked about this stuff for a while and has researched it for a long time, but, like many other professors, never actually used it in his teaching. Last year, he decided to do an experiment with his students who, as Harvard graduate students, are even more privileged than LA Richard's Cambridge undergraduates.

He took his them in the basic course in cognitive development where they study Piaget, Bruner, Vygotsky and people like that, and tested them three times during the course of the year: in the beginning, in the middle and at the end. He tested them for two things: their mastery of content and their understanding in the terms that he defined that day. Could they use what they were learning in the course to explain new situations, things in the newspapers, vignettes that I brought in, and so on? The results were quite shocking!

According to Gardner the greatest enemy of understanding is coverage. If you are determined to cover everything in the book, you virtually guarantee that very few students will understand. So, if you want to educate for understanding you have got to make tough choices about what to focus on.

Imagine a graph in your mind—this is good, this is bad, this is over the course of the year; you can reverse them. In content, the students went steadily up. They knew very little content in the beginning, a fair amount in the middle and were very good at the end. They were good students. They are Harvard students. But you know what happened to the understanding? Absolutely flat—and not a ceiling effect, but a floor effect. They were not very good in the beginning, they were not very good in the middle, they were not very good at the end. There were a few exceptions, just like there are few exceptions everywhere, but even at Harvard, students do not necessarily understand what their professors are teaching!

Thoughts Gardner's had during the past year—little epigrams that summarize the things that are important to him.

After working for 25 years in the area of psychology he realized that he have been interested primarily in two things. One is how to observe students carefully, and multiple intelligence theory is a way to look at students more carefully. The other is how to observe student work more carefully, and this is done by having assessment that looks at student performances very carefully.

Gardner feels not much time is spent watching the students and developing a model of how particular students learn; not nearly enough time is spent looking at student work. He gives a few examples:

Teacher's Fallacy. "I succumbed to it for 20 years. I taught a great class, therefore the students understood. It is rather Cartesian isn't it? I teach, therefore you understand. The only way you can find out if students are understanding is to actually have them do some work."

One thing that has become very popular in the United States is the minute paper. At the end of the course, and every session, you ask the student to write down one thing that he or she learned in the period and one question that they have. It's a revelation! Gardner says he never ceases to learn when he does the minute paper. He

feels it is the misconceptions that are what is beautiful. They are wonderful misconceptions but unless misconceptions get out in the open they sit there underneath that powder.

He feels that one must look at students' work, and if you cannot, the unfortunate conclusion is that you shouldn't teach. Because, if you don't look at your student's work, you have no idea whether they are learning anything. He used to think that, if they simply changed the assessment, everything else would be fine.

Even if you have wonderful assessment, if the curriculum isn't good, the assessment is worthless. You can have

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wonderful examining boards sitting in Geneva but if the curriculum is not adhered to or has not been made up yet, it is worthless. You can have wonderful assessment and curriculum but if the staff is not developed, teachers are not educated even before or during the experience, the assessment and curriculums are worthless.

"School doesn't have to be the way you remember it."

Unfortunately, the unschooled mind even applies to parents and teachers; they have a stereotype formed by the age of five about what school is like. Namely, somebody in front of the

room talking like me, and they are sitting in their seat, trying to be quiet and all the knowledge is in my head and the purpose is to put it into your head.

That is a very powerful idea. Whether people love school or hate school, they all have that stereotype. The opportunity for education for understanding is not going to be seized unless we help people think differently about what school can be like, what can be studied, how it can be taught, how it can be learned. ■

Adapted from an article based on Peterson Lecture that Dr Howard Gardner presented informally in Geneva on 1 December 1992 and further edited in 2003

GOODWORK IN BUSINESS

Kim Barberich and Howard Gardner

I. BEING A GOOD PROFESSIONAL

It has never been easy to be a professional in both senses of the word "good" technically expert and morally responsible. This difficulty is augmented in a world that is rapidly changing due to technology, globalization, and powerful market forces. Radically altered senses of time and space have placed added strain on the ability to be a good professional—indeed, even to know one's responsibilities.

While the notion of an expert professional is relatively straightforward, the idea of the "responsible professional" requires comment. In our view the responsible professional is a person who relies on moral and ethical principles to guide her, feels a sense of obligation to company and community, and contributes to society. Though it is clearly challenging to carry out work that fulfills these technical and ethical criteria, the ability to execute such work is crucial in our time.

The first two professional realms that we examined in our Good Work study were journalism and genetics. We selected these realms because of their undeniable importance in the world today. Journalists have a great deal to say about what is in our minds, about the "memes"—the units of meaning—that impact us and that we pass on to others. Geneticists have a great deal to say about our bodies (our "genes"), our health and longevity prospects, as well as the welfare of our children.

While we selected these two realms because of the intriguing meme/gene contrast, the two domains turned out to differ on an important and perhaps under-appreciated dimension. Geneticists find themselves in a realm that is well-aligned: the various parties that are interested in their work are all in substantial agreement about what should be done. More specifically, the individual practitioners, the senior "trustees" of the field, the various institutions in which genetics research are carried out, and the shareholders and stakeholders all desire breakthroughs in understanding that will yield healthier and more long-lived individuals.

In striking contrast, journalism emerges as a realm that is massively misaligned. Journalists are guided by one set of principles, the core of their chosen calling; the major institutions in which they work (e.g. multinational corporations that own newspapers and broadcast media) have another set of goals and objectives; shareholders are motivated chiefly by a desire for greater profits; and the general readership, either on its own or through manipulation, has a great appetite for scandal and gossip, and, at least at present, very little concern about the larger political, social, and economics events of our time. Not surprisingly, many journalists are depressed and frustrated by their profession: while geneticists cannot wait to get up in the morning, journalists look back nostalgically to a Golden Age in the past.

But we also discovered that alignment can occlude problems. If forces are too well aligned, possible dilemmas or problematic issues may be disregarded or viewed as insignificant. In biotechnology companies we discern an increasing blurring of lines between science and commerce. When the financial wellbeing of a company is at stake, conflicts may arise regarding who makes the final decision; the shareholders, the managers, or the scientists? If research scientists are

vested in the company that they work for and their findings might increase the value of the company's stock they may be tempted to speed up the discovery process regardless of possible dangers to patients or research subjects. Any or all of these factors could undermine the alignment, giving rise to research scientists as frustrated as the journalists of today.

II. THE VIEW FROM BUSINESS

Recently we have undertaken a parallel study of business. For this branch of the project we interviewed two groups of people: 1) Individuals nominated by academics and peers in the business domain, for their entrepreneurial achievements and social responsibility; and 2) Individuals selected on the basis of their accomplished reputation in business but not known one way or another for their social responsibility.

"Good work" is used in a dual sense: 1) work that is deemed to be of high quality and 2) work that is socially responsible.

Most of the individuals we interviewed impressed us as good workers in the sense described above: proficient and ethical. Some have created new companies while others have implemented successful changes to already existing organizations. In the aggregate, they see their work as a welcome challenge, they take risks, they sustain their commitment in times of discouragement, and they are more often than not humble about their success. Many have made sacrifices while attempting to maintain an ethical and moral integrity—to be a good professional. We believe that this population harbors lessons that could be of use to individuals who are entering business as well as business workers who may have lost their moral compass.

Like genetics, business appears to be in alignment at the start of the new century. The American economy is strong, unemployment is down, and profits are at record "highs" for both those working in the domain and for shareholders who own stock in prospering companies. In fact, with the amazing success of so many technology companies at times it seems as though not being in business is a misfortune. However, even in such good times, good work is hard to carry out. There are still obstacles that need to be faced. Profit making and meeting the bottom line are often easier to accomplish by ignoring one's principles. Given the fast pace of many young companies there is a strong desire to create a business quickly, sell it and make a bundle rather than building a solid organization to commit to and watch grow. In addition, the forces that traditionally countered untrammelled market forces in the past, like religion, ideology, and government, no longer operate with the same potency. We might say that, today, there is no external check system because the market itself serves as the checking point. This is why it is so important that every individual, regardless of her given profession, learn to develop an internal check system—a series of lines that will not be crossed—with an eye towards society and the larger world.

III. LESSONS FROM BUSINESS

While coming from different businesses, diverse backgrounds and varied lifestyles, our interview subjects share many of the same guiding principles. These principles, elaborated on below, include responsibility

With the amazing success of so many technology companies at times it seems as though not being in business is a misfortune. However, even in such good times, good work is hard to carry out. There are still obstacles that need to be faced. Profit making and meeting the bottom line are often easier to accomplish by ignoring one's principles.

to self and others, honesty, accountability, faith in one's self, and thoughtful contribution to society. Subjects rely on these principles as they go about their business and have succeeded in integrating these principles into several parts of their lives. As such, they differ from widely-held views of business people today. While many business personnel apparently believe that one must trade success for moral or ethical responsibility, the men and women we interviewed believe in just the opposite. By the same token, many leaders in business apparently deem their primary responsibility to the financial health of their company, and readily rationalize behavior in accordance with this belief. The professionals with whom we spoke have disdain for peers who suspend their principles in order to fatten the bottom line.

1. RESPONSIBILITY

At the heart of being a good professional is a deep-seated sense of responsibility. Responsibility in our participants' lives is parsed as an obligation to one's self, others, the company, the business profession and society. While it is unrealistic to expect that all responsibilities can be monitored and honored at all times, the good professional considers one or more of these responsibilities when making decisions and rendering judgments. Such monitoring allows the good professional to measure her actions with a clear and critical eye.

While all our subjects understand the need for profit, they also believe that business should support and develop the people that contribute to it. They feel a

deep-rooted responsibility toward everyone they work with; this includes employees, partners, and customers. Michael Murray, former vice-president of human resources at Microsoft, wanted to create a work place where all employees could feel a sense of accomplishment and pride based on their work and at the same time be able to participate in a life outside work that was meaningful and purposeful. Murray firmly believes that the "soft stuff", as he puts it—structuring a successful team, rewarding good work, being a good leader—are just as essential for the health of an organization as making a profit. Yet, even at a company as respected and successful as Microsoft, Murray felt that gaining currency within the company for "human elements" was a challenge. The only way that he felt he could emphasize the importance of these key human issues was to engage senior management in a lively dialogue so they could begin to understand the significance of them in regard to the livelihood of the corporation.

At ServiceMaster, a company that provides outsourcing services; lawn care, landscaping, heating and air conditioning, to customers worldwide, the "development of people" is an important component of the mission statement. One manifestation of this priority is that business decisions are always discussed in light of their effect on individuals who work in the company. When we interviewed the chairman and CEO of ServiceMaster, William Pollard, he referred to a meeting that he had just held with a manager responsible for the enterprise in a major foreign country. The manager was up against a difficult situation and needed to make some decisions. The meeting focussed on possible options for this manager's business unit. Half the time was spent conferring on how these options would affect the business, while the other half of the time was spent discussing how the options would affect people working in that business unit. Pollard underscores the difference between looking at a person as an object of the work and considering the person as a subject of the work. Examining what a change or decision can do to develop and empower an "individual-as-subject" is more important than judging what an "individual-as-object" can do for the company. This consideration promotes hard work and

teamwork and is essential for building a strong community within a company.

2. HONESTY AND ACCOUNTABILITY

The professionals we interviewed deliver the truth when needed and stand accountable for their mistakes or problems. In turn, they expect the same from others. Honesty and accountability are essential for building a lasting and reputable enterprise. While often requiring more work, these values force one to consider the repercussions of providing poor service, faulty products, or making frankly unethical or immoral decisions.

For many in our sample, honesty and accountability simply come down to doing what is considered the right thing to do. Michael Hackworth, president and CEO of Aspirian Inc. and chairman of Cirrus Logic, both technology companies, lives by a simple ethic imparted to him by his mother. He will not do something that would embarrass him if it were printed in the morning paper. Hackworth admits that being honest and accountable in every business situation can be challenging especially when one is running a public company. When conditions are good in the company and the stock is up everything is fine ("aligned" in our terms); but when conditions deteriorate and the stock drops, both executives of the company and shareholders go through hard times.

A business judgment that arises here is how one deals with the financial markets during a critical time. There is a tendency on the part of many executives to keep quiet and attempt to fix the problem before the stock drops or drops further. Hackworth believes, however, that as soon as one knows about impending problems that could affect stock prices, one has an obligation to disclose them. To be sure, the idea of standing in front of your shareholders and admitting error certainly sounds daunting. Yet Hackworth believes that presenting the truth and fixing the problem, even if the stock drops temporarily, builds credibility. As Hackworth put it, the shareholders may not like what you say or even like you when you admit error, but after the problem is presented and repaired they will know that they can count on you (B8, p.19). "You have to have a standard that says I'm not going to violate that criteria and I will take the short-term hit, and I will solve the problem then, it's tough, but that's what you have to do".

Hackworth relates that several years ago he served on the board of a company whose founder boosted shareholder expectations by inflating the company's sales forecast substantially based on possible sales to new distributors. When Hackworth questioned the founder's actions and stated that he could not count sales until the distributor sold the product, the executive stated that, as far as he was concerned, it was usual and common practice. Hackworth decided that he could either head up an audit committee at this company or step down from the board. Because the company was running a business akin to Hackworth's and

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knowing that they would eventually be competitors Hackworth felt that auditing them would be unethical. He stepped down from the board and was not surprised to read three years later that the company had filed for bankruptcy and the executive was under indictment.

3. FAITH IN BUSINESS

Even when a domain seems well-aligned, there are times when one feels discouraged and pressured. Yet, it is often during these times that committed business personnel realize a

faith in the profession, the people with whom they work, and their own selves. Often though not always, this faith is connected to religious principles or ethical precepts that were learned during one's early years.

McDonald Williams is the chairman of Trammel Crow, a commercial real estate company, and he recalled vividly a difficult period—"a moment of truth"—he experienced twenty years earlier. At the time the country had come into a recession and Williams had a young family, a mortgage and responsibilities. Nervous that he had made the wrong decision working for Trammel Crow, he considered returning to law where he knew he could make a decent living. In an attempt to come to terms with his struggle Williams had an "epiphany"—he suddenly remembered why he entered into business. He valued the people he worked with and although he felt that external business environments had changed, he knew he could make a difference in his company. Williams believed in himself, the employees in the company, and the company's mission. He stayed on, was soon promoted to CEO and within several years, the company had turned around dramatically.

Fifteen years later, Williams faced another challenging time. The company hit financial hardships again. This time as CEO Williams was embarrassed and knew that he had let many down. Numerous people he had worked with for years and whom had profited during the good times left the company not wanting to take any responsibility for its current problems. Williams stayed on as CEO because he knew that he had an obligation to get the company out of the red. The earlier "epiphany" provided him with the faith to keep on working, to mend the problems, and to put the company back on its feet. Williams feels that his faith was, "more relevant to my business in tough times than anything else because then your values really were square in your face". In challenging times, Williams discovered, it is imperative to look beyond the moment to a longer time frame, to see yourself as more than your personal career or your net worth. After the hardship Williams remained as CEO of Trammel Crow and watched the company experience new profit and growth. A few years ago he stepped aside so that he could work on the renewal of low income housing in the Dallas.

4. CONTRIBUTIONS TO THE WIDER GOOD

For many good professionals, a primary goal in their lives is making a contribution to society. While this goal may reflect their acquisition of wealth, the individuals with whom we spoke stressed giving back to society and making a difference. In their view, this philanthropy requires more than just writing a check. It also entails donating time and expertise to non-profit organizations. Our professionals want to use their talent, business expertise and monetary resources productively and thoughtfully.

Deciding where to donate one's time and money can be complex. When Orit Gadiesh, the chairman of Bain & Co., an international management consulting firm, makes a donation for her company she wants it to be meaningful. The issue for her is giving money with the ability to also give time so that there is real involvement. This can mean providing a team of employees for a project or getting the whole office to do something together. Either way, Gadiesh says, "I don't think your mind and your heart are really into something unless you're willing to give that".

With his partners, Richard Jacobsen, manager of a real estate development management company, started the California Family Foundation, an institution that deals with educational, housing and employment issues. The Foundation started because Jacobsen and his partners saw a lot of need in their local community, and decided that if they focused their energies and resources they might be able to do something that would be helpful. In addition, Jacobsen and his partners felt that it would be both challenging and satisfying to take their expertise and resources and put it to work in their community. Today the Foundation is over twenty years old and runs a local private school that has a hundred and sixty students and teaches kindergarten through eighth grade. Jacobsen stands behind his belief that all individuals need to give more and still questions, "how do we, for those that are equipped, by temperament or whatever else, to be able to function successfully in the market, how do we help those that are not?".

Anita Roddick, founder and co-chairman of the board of The Body Shop, incorporates her concept of "giving back"

The most impressive professionals have not led perfect lives. We would go further and suggest that being a good professional is a process learned through mistakes and error, properly reflected upon.

into everything she does. In reflecting about how her goals have changed over the years she says that they, "have been reduced and polished to [caring about] what person's life you can affect". Her primary goal is, "nothing more than creating a sense of humanity in what [she] does and within the business world". Roddick has accomplished humanitarianism work all over the world which range from living with families in Appalachia, West Virginia, to working in refugee camps in Albania. Her moral conscience is also visible in how she runs her company. During the Gulf War Roddick had billboards erected denouncing the war, and had petitions in all her shops demanding its end. Although she was told by senior management that the anti War sentiment in conjunction with the company name needed to stop, in true nature Roddick closed down operations for a day and allowed employees the opportunity to debate and discuss the War as well as the company's stance on it.

In fact, Roddick views her company which she founded in 1976, "as an extension of [herself], and not set up for anything other than to challenge wrongs". She feels money should be given away strategically—not just handed out but put into foundations. She sees her job as being a moral leader within her organization and doing things that the young people in her company will look up to and be proud of. Despite her great efforts to incorporate giving back into her own life she wonders, "how do you keep [young employees] away from a value system of endless increasing wealth to one where humanity, community, is part of the value system?".

IV. TWO CAVEATS AND A CONCLUSION

We believe that the stories of respected leaders like this can inspire and teach

others to be good professionals across the various domains of society. It is important, however, to keep two caveats in mind.

First of all, our study relies heavily on the testimony of creators and leaders in different domains. One can reasonably expect that these individuals will describe themselves in a favorable way; and more than once we have discovered, to our regret, that the actions of our subjects did not match their words. We nonetheless feel that the advice can be important, even when it has not always been followed by its dispenser. Thus we describe our study as an examination of good work, rather than as an effort to decide who is, in actuality, a good (or a not-so-good) worker.

Second, even—and perhaps even especially—the most impressive professionals have not led perfect lives. We would go further and suggest that being a good professional is a process learned through mistakes and error, properly reflected upon. In many cases it is only through obstacles and difficult decisions that one learns to develop goals and strategies based on ethical and moral principles. And one learns the most from those individuals who have survived their missteps and are willing to talk about them publicly.

Ultimately, we hope to study the nature of good work in a large number of professional domains, and in several societies. At a time when market forces are the most powerful and least opposed in history, it is crucial to think about lines other than the bottom line—the lines that one does not cross even when one could legally do so. We anticipate that guiding principles like responsibility, honesty, accountability, faith and contributing to society can help many individuals to navigate murky waters during times that are exciting but filled with uncertainty. ■

Paper prepared for volume in Peter Drucker Series on Leading for Innovation, edited by Frances Hesselbein and Marshall Goldsmith

5 MINDS for the Future

We are living in an accelerating world of change in every area of life. Gardner believes that such changes call for new ways of learning and thinking if we are to thrive in the world during the eras to come. The directions our society is taking and the future of our planet demands such 'new minds' able to explore creative alternatives for problems that cannot be anticipated.

By Howard Gardner

Education is fundamentally about values, but we have a great deal of difficulty talking about values. In the United States now, we rarely teach Philosophy of Education or History of Education, because people would disagree too much. There is local joke in the United States called the "Jesse Test": You could never, in the United States, come up with a curriculum that would please: Jesse Helms, a conservative Southern senator; Jesse Jackson, a fiery, African American leader; and Jesse Ventura the wrestler-turned governor of Minnesota. And therefore, we simply don't talk about values.

The economist J.M. Keynes said that you can put down economists as much as you like, but whether we know it or not, we are all acting according to the theory of some long dead economist. I believe the same about education. People who have never heard of Rousseau, Hobbes, Kant, or Dewey, are living their educational philosophies, erroneously thinking it is their own philosophy.

Five Minds are competencies which young people and the society need in the twenty first century going forward. This in the sense is also about my own values. If I were the Tsar of education worldwide, this is what I would prescribe. However, I remember what happened to the Tsar, and so I am more cautious.

People who know my work in education think of me as the man who proposed seven, eight, or nine different intelligences. When I write about

intelligence, I am trying to be a scientist. If we really understood human evolution in detail, we would see that the mind and the brain are composed of a number of relatively autonomous computing systems. For example, one system is for language, one for music, one for spatial cognition, etc. In talking about Five Minds I am of course interested in psychology, but I am really speaking from the perspective of policy. And in that sense, there are many other minds that I could have talked about. As the policy maker/Tsar, these are the minds that I would try to promote today and tomorrow.

Here are some images of the future: The genetic revolution: within all of our lifetimes, young people will go to school with gene chips which contain their entire genome and they'll say to teachers and administrators "these are the genes that are inactive, these are the ones that are working- teach me effectively!" and we will not be able to ignore that plea. More images of the future include: Mega cities, images and fashions that circulate around the world; trillions of dollars traded 24/7 each day; machines which do thinking, carry out tasks which used to be done by human beings; virtual realities like "Second Life".

A hundred years ago, most people didn't go to school, and those who did left school at twenty years old, confident that they would never have to be further educated. But nowadays as one biologist told me, if one doesn't keep up for three months one will never

be able to catch up again. All of you know the speed with which knowledge accumulates in almost every sphere. Much of our education has to be self-education.

Here are some descriptions of changes which will impact educational thinking. Many people work on problems which cut across disciplines. They converge on a geographical area, work together in teams, build on one another's knowledge, then separate and maybe connect electronically, but maybe never work together again.

Linear thinking doesn't end, but non-linear kinds of thinking, systemic thinking, and dynamic models are in the ascendancy. So much of "thinking within the box" can be done by automata, and so the capacity to be one step beyond computers takes on additional importance. Most of our students are already way ahead of us digitally whether we are teachers or parents, and that raises interesting questions about what it is that they have to give to us and what it is that we have to give to them in terms of the educational dynamic.

The plan for the rest of the talk will be to describe the five minds. I will be concentrating more on the Synthesizing Mind and the Ethical Mind because I think that they are less familiar, and frankly, I find them more enigmatic and thus more energizing to explore.

THE FIVE MINDS

THE DISCIPLINED MIND

I was asked in the year 2000, "what was the greatest invention of the last two thousand years?" My answer was classical music. The real reason I gave that answer is because I wanted to be quoted, and I knew if I said something such as "the wheel, the pill, or nuclear energy", many other people would have said the same thing and I might have been quoted. But, if I say classical music, I would have the prospect of being cited in a magazine.

A better answer, and an answer which I think we can all feel at home with, are the scholarly disciplines. I would include: Classical Music, Science, History, Economics, etc. Those of us in academia take these disciplines so much for granted, that we forget they are all human inventions. It took hundreds of years to invent Experimental Science, Classical Music, linear Perspective, and Calculus. And they might well never

have been invented. Often, when tyrants come to power, they try to eliminate the disciplines and the disciplinarians because they/we get in tyrant's way. Therefore, I believe that one needs to begin with disciplinary thinking.

When I use the term disciplinary thinking I am playing on three connotations of the English word discipline. Firstly, what our grand-parents knew—you should work regularly and steadily on things and eventually you will get better. Indeed, any practice will build up disciplinary muscle.

A hundred years ago, most people didn't go to school, and those who did left school at twenty years old, confident that they would never have to be further educated. But nowadays as one biologist told me, if one doesn't keep up for three months one will never be able to catch up again.

The second—is the heart of what happens in middle and secondary school—is mastering the major ways of thinking. Before university, they are Science, History, Mathematics, and one or more art forms. I make a very sharp distinction between discipline (a powerful but typically non-intuitive way of thinking) and subject matter (facts, information).

The third connotation, which is so important if we want our children to be gainfully employed and have a full life is becoming an expert in at least one thing. Because if you are not an expert, you will not be able to work in the world of the future,

or you will work for somebody else who is an expert. And that is so different from two hundred years ago during agricultural times and a hundred years ago during industrial times. Now, we are really in a knowledge era, and expertise is the only thing which will take forward real value.

Now, I just introduced a distinction between discipline and subject matter. In most schools, in most parts of the world, though probably not in your schools, we "do" subject matter. Subject matter means information and facts. Things like, "Which king followed which queen? What was the year that something happened? What's the atomic weight of lead? How many planets are there in the Solar System?" But that has nothing to do with disciplinary thinking. Disciplinary thinking is the deeply different ways in which scientists or historians or artists approach their daily work.

To illustrate this point, I'll compare Science and History. Scientists create models of the world; they try to explain the physical, biological, psychological worlds. They develop theories, they carry out experiments, or they do observations—and when those empirical works are carried out, the theories are revised in light of the outcome.

Historians on the other hand, try to figure out what

happened in the past. They primarily use written documents, more recently graphic documents, and in some ways human beings are no different from how they were three thousand years ago. Historians have to understand the missions, fears, and purposes of human agency. But in other respects, over time and across cultures, people are very different. Historians always have to play with that antinomy.

Finally, every generation has to rewrite history. If you are an American, when you write the history of the Roman Empire today, it is totally different than it was fifty years ago. Not because we know so much more about Rome, but because the United States today is the Roman Empire, for good and for ill; not to think about that state of affairs is to be in outer space.

Those are the things which you can't just pass on to people. In contrast if I want to pass on a list of American presidents, I can carry that around in my hand and pass it on. And so disciplined thinking is very different from subject matter thinking. It is our responsibility to our middle and secondary schools to engender the disciplinary habits of mind of the major disciplines. Because otherwise, we won't be able to make sense of what is happening in our world in terms of current events and new discoveries—whether good or ill. This is what history has needed, and we won't be able to make decisions about health and about policy unless we have cultivated those ways of thinking. The more international comparisons (like the PISA rankings) focus on subject matter rather than on disciplinary thinking, the more anachronistic they will be.

No cigar. When I was a young boy we used to go to Carnivals and they would have Kewpie-dolls on a ledge. You would be given a ball and your job was to throw the ball and knock down a doll. If you got the doll you could keep it, but if you missed the barker would say "close, but no cigar". So, in each case of each of the minds I am going to talk about false or faux examples.

One example of the poorly disciplined mind is when people see everything through one discipline: economists who see the whole world through rational choice; psychologists who see the whole world through evolutionary psychology; the lawyer who sits down with his children who are two and three years

old and writes down a constitution which gives the children their rights and their responsibilities. That is hyper disciplinarity.

The second example comes from the life of Arthur Rubinstein. He was a world famous pianist. From the age of twenty, he gave concerts which had an enormous reception, but then he became lazy and he relied on pyro-techniques rather than careful practice. But, he came to realize that if he didn't practice for a day he knew it; if he didn't practice for a week the orchestra knew it; and if he didn't practice for a month, the audience knew it. Therefore, he stopped his wild and carousing ways and began to practice each day and essentially recovered his discipline. The lesson here is that you can think disciplinarily for a while but ultimately you have to keep up the disciplinary muscle if you want to be taken seriously by those 'in the know'.

THE SYNTHESIZING MIND

Life is short, syntheses are due, term papers are due, lectures are due, but you want to finish the proto-synthesis some time beforehand, so that you can get informed reactions. Not only from people who know a lot but also from people who don't know so much.

I began to think about the Synthesizing Mind when the great physicist Murray Gell-Mann made an off handed remark. He opined that in the twenty-first century, the most important mind will be the synthesizing mind. A great example of a synthesizer is Charles Darwin. He travelled for five years aboard the Beagle, and collected a huge amount of information about the flora and fauna of the world. He did his own experiments and observations of the world, corresponded with everybody who was a naturalist, and then twenty years later put forth one of the great intellectual syntheses "On the Origin of the Species."

The Synthesizing Mind realizes that nowadays, we are all inundated with information. If you looked up the word "evolution" on your search engine, you could spend the rest of your life just reading secondary sources. Many of them are of questionable value and you need criteria for deciding what to pay attention to and what to ignore. Additionally, to synthesize for yourself, you have to put information together in ways which cohere, which make sense for you. And if you are involved in communication, as every teacher, parent, and professional is, the synthesis has to be transmittable to other people.

I thought that psychology would have something to say about synthesizing because it is so important, but my research revealed that in fact psychology doesn't have much to say. Some of you are thinking: "well, isn't

synthesizing what teachers have always done?" But let me introduce Monsieur Jourdain from the Bourgeois Gentleman by Molière. M. Jourdain got very excited in middle age because he found out that he was speaking prose all his life without realizing it. I think we have been in the business of synthesizing, but we haven't been aware of how important it is and how we might help other people to become better synthesizers.

How one might be more reflective about synthesizing? The answer is: looking for the current best synthesis, deciding what our ultimate synthesis should look like, picking a method, deciding what are we going to look at, listen to and why, examining what are we going to ignore and why, and importantly, how are we going to record information, using equations, mind maps, stories, formulas, taxonomies, or whatever. Again, the kind of things that most of us do already, but we aren't really reflective about it, we don't spend much time explicitly transmitting that lore to people who are less experienced in synthesizing. Life is short, syntheses are due, term papers are due, lectures are due, but you want to finish the proto-synthesis some time beforehand, so that you can get informed reactions. Not only from people who know a lot but also from people who don't know so much.

Finally, "nocigar" syntheses which try to do too much, which are too narrow, or which are eccentric are not adequate.

THE CREATIVE MIND

The Creative Mind is embodied by Einstein in the Sciences and by Virginia Woolf in the Arts. People who are creative are those who come up with new things which eventually get accepted. If an idea or product is too easily accepted, it is not creative; if it is never accepted, it is just a false example. And acceptance can happen quickly or it can take a long time.

I believe that you cannot be creative unless you have mastered at least one discipline, art or craft. And cognitive science teaches us that on the average, it takes about ten years to master a craft. So, Mozart was writing great music when he was fifteen and sixteen, but that is because he started when he was four or five. Same story, with the prodigious Picasso. Creativity is always called "thinking outside the box." But I order my quintet of minds in the way that I do because you can't think outside of the box unless you have a box.

As a psychologist, I thought that creativity was mostly an issue of how good your mental computers were. But my own studies and those of others have convinced me of two other things. First, personality and temperament are at least as important as cognitive powers. People who are judged creative take chances, take risks, are not afraid to fall down, and pick themselves up, they say "what can I learn from this?" and they go on.

The other day I was giving a talk and the first question asked was "How do we make people creative"? And I answered that "It's much easier to prevent it than to make it". You prevent it by saying that there is only one right answer and by punishing the student if she offers the wrong answer. That never fosters creativity.

Second: People think of creativity as a property of the individual and therefore they say "I am creative", but that doesn't work. The only way that creativity can be judged is, if over the long run, the creators works change how other people think and behave. That is the only criterion for creativity. Therefore, the bad news is that you could die without knowing that you are creative, but the good news is that you will never know for sure that you are not creative. Because maybe after you die, people will make a big fuss about you and then, post-mortem, you will be creative. That's what happened to Emily Dickinson and Vincent van Gogh. We call that the judgment of the field.

There are many examples of false, or no cigar creativity. In the eighteenth century people thought materials burned because of a substance called phlogiston, but it turns out that there is no phlogiston. In the nineteenth century people thought that we all existed in something called the Ether but there is no Ether. In the twentieth century, people thought you could produce virtually infinite amounts of energy by passing some electric current through water, but cold fusion didn't work. And if you go through most best-selling books and most art shows, in ten or twenty years they will be forgotten. Consequently, there are alas a lot more examples of failed/no cigar creativity than there are of what Mihaly Csikszentmihalyi calls "Big C" creativity.

If I had given this talk ten years go, I would have stopped here, because my work as a cognitive psychologist has been about thinking, problem

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solving, and intelligence. Also, there is a natural progression from having a discipline, to being able to synthesize, to creating something new. But for the last dozen years, I have been working chiefly in the human sphere, relations of people in groups and to one another, and thus the last two kinds of minds deal with this human sphere. They are called the Respectful Mind and the Ethical Mind.

THE RESPECTFUL MIND

The Respectful Mind is quite easy to explain, but that doesn't mean it is easy to achieve. The Ethical Mind, as I think about it, is more complex. The respectful mind is no more or no less than what gave rise to the League of Nations and the United Nations. It is recognizing that the world is composed of people who look different, think differently, have different belief and value systems, and that we can no longer be hermits and live in complete isolation. Therefore, our initial choices are to make war, (which is what we did in a tribal society), or to hold our nose and tolerate others. But we can be more ambitious.

We can try to understand better, make common cause with, and give the benefit of the doubt to other people. This process begins with birth. It is how the father, mother or care-taker treats the child; how parents treat one another, how siblings treat one another, etc. I can go to a school in the United States and I can determine within minutes whether there is a respectful atmosphere. You can observe it in the ordinary interactions between teachers, staff, kids and so on.

Here are some examples of no cigar: respect with too many conditions, mere tolerance, bad jokes (jokes at the expense of others), and then something which we are all becoming familiar with: Kiss up or kick down. Kiss up is when you flatter people who are more powerful than you, people that you want something from, and once that dynamic stops, you ignore or give them a kick. There are plenty of examples of disrespect anywhere.

There are promising examples of those who try to institute respect in the world: Commissions in peace and reconciliation which take formerly warring groups, the victims and victimizers, and try to arrive at an understanding which can include forgiveness. As a music lover, I am interested in those musical efforts, such as the Middle Eastern Orchestra (associated with

Daniel Barenboim and Edward Said) and The Silk Road Project (associated with Yo-Yo Ma). These are efforts to get people from different societies and cultures to make music together to understand their relationship to music, and to use this kind of "aesthetic ping pong" to break down barriers. And we need to be very much on the look out for whenever institutions and practices can enhance respect.

I actually changed my own mind as a result of this work on respect. Concerning the Danish cartoons that mocked Islam in 2005, my initial reaction as a civil libertarian was to think of free press; people should be able to say and draw what they want. But, I've changed my mind about that. I think it was a mistake to publish the cartoons. I wouldn't put anybody in jail and indeed with blogging nowadays you cannot prevent anybody from transmitting anything on the internet. But I make a distinction between the respectable press and the not respectable press. I think the respectable press

should say what it wishes to say clearly—in plain natural language, be it Danish or English-- but not inflammatorily. And I think the Danish cartoons were unnecessarily inflammatory.

THE ETHICAL MIND

The Ethical Mind involves a higher level of abstraction. Being in the world involves a higher level of thinking. Because the Ethical Mind does not say, "how should Howard Gardner behave towards others?" But rather, it says, "I am a worker, in my case a teacher, writer,

scientist and I am a citizen, in my case of my university, my community, my nation, the wider world—how should I behave?" Not in terms of what my rights are, but what are my responsibilities as a citizen, as a worker, within the school context, what are my responsibilities as a student and as a member of a school community? And of course it's great to know your responsibilities but it is not sufficient; to be sufficient you have to act on the basis of responsibility. Thus, the Ethical Mind reflects on different roles that we fulfil and talks about what are the proper ways to fulfil those roles and tries, though not always successfully, but at least makes the effort, to fulfil those responsibilities.

The work that I have done has been in collaboration with many scholars, particularly William Damon and Mihaly Csikszentmihalyi. It is called "The Good Work" project. We define good work as a work that embodies three Es: excellence in a technical way;

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engagement—that people are meaningfully involved with what they are doing and they find it motivating. They look forward to Monday and are even willing to come to the meetings on Saturday! and ethical, behaving responsibly in your world as a worker. I think of these three Es as a triple helix. And interestingly these three Es don't necessarily coexist. You could be excellent but not ethical. You could be ethical but not engaged.

The challenge of good work is to intertwine those three Es. And we have carried out a very large scale and careful project over twelve years, almost entirely in the United States, trying to understand what makes for good work and how one carries out good work at present. Things are changing very quickly, our whole sense of time and space is being altered by technology, markets are very powerful, and especially in the United States there are no forces able to mediate or moderate or modulate the markets. Therein lies the challenge of good work.

My colleagues and I did a study of good work in young people from the ages of 15–35. Wendy Fischman and others wrote a book called *Making Good: How do Young People Cope with Moral Dilemmas at Work* and we found a very disturbing picture. I give you this picture although it may not exist in your country. But alas just as in the United States what starts in California ultimately tends to make its way across the country, often in the world what starts in the United States travels all too quickly elsewhere.

We found that the best and brightest, those young people who are the elite of your schools and are already winning awards, knew what good work was. Some of them tried to be excellent and ethical and engaged, but many of them told us that they could not afford to be ethical. Because, they said, it was very important for them to succeed, to have money, power, prestige, prominence. Since they were in competition with their peers, they suspected that their peers were cutting corners and they were not going to be upright, if that meant that they were going to lose to somebody who was less ethical. And so they told us that someday they would be ethical, that they would be the cream of their community, serve as a role model, support good causes, and hire ethical people. But they couldn't afford to do it now. We are reminded of what Saint Augustine said "Oh Lord, make me chaste, but not quite yet".

And that is what these young workers were telling us. They were not typically bad workers since they weren't doing things that were illegal, but they were doing compromised work. They were doing journalism and making things up, or taking things from the web and not verifying the source. They were doing science but not running the extra control or not sharing the data with people who share the data with them. They were compromising.

This finding has changed my life. I am now spending my time with people in secondary school and colleges. We are exposing young people to ethical dilemmas and having them think about them, as well as role playing, and essentially trying to make them carry out what we call meaningful work and a meaningful life. Not focussing so much on the next prize, but thinking in the long run what kinds of human beings we want to be and what kind of world we want to live in.

An example: Marilee Jones was a very successful Dean of Admissions at MIT for many years, but it turned out last year that she had faked her own resumé by inventing the degrees that she didn't have. And MIT had no choice but to fire her, because how can you judge other people's records and ask for their honesty when you yourself have lied about your past? There were only two reactions among students whom I was teaching: one reaction was that she was doing a good job so why was there a problem? The second reaction was "well, everybody lies on their resumé, right?"

The Ethical Mind does not say, "how should Howard Gardner behave towards others?" But rather, it says, "I am a worker, in my case a teacher, writer, scientist and I am a citizen, in my case of my university, my community, my nation, the wider world—how should I behave?."

CONCLUSION

I want to close with two interesting quotations from Americans who have a deep sense of what is important. Reverend Martin Luther King Jr. said, "Intelligence plus character—that's the goal of true education". And philosopher Ralph Emerson said, "Character is more important than intellect". You are all in the business of educating young people and there are enormous pressures to make them excellent and especially IB schools which are good at achieving that end. I have nothing against excellence, but at the end of the day we do not need more of the best and the brightest, but we need more of those who have good character. That is why the issues of respect and ethics, which are hard to measure objectively, are so terribly important. In conclusion, these are the main elements of my Five Minds. ■

The MISEDUCATION of Our Gifted Children

The notion of providing special education to those with the highest abilities offends our egalitarian sensibilities. The gifted are seen as specially privileged and thus as not in need of special help.

By Ellen Winner

Numerous studies confirm a sad finding: the most intellectually gifted students in the US typically have little good to say about their schooling. Gifted children are usually bored and unengaged in school; they tend to be highly critical of their teachers whom they feel know less than they do, and they are often underachievers. In the best case scenario, teachers recognize a student as gifted but, unable to teach at this level, they let the child learn independently. In the worst case scenario, teachers fail to recognize a child as gifted and classify the child as unmotivated or even hostile.

Why do our schools fail our most gifted students? I believe there are two reasons. To begin with, the notion of providing special education to those with the highest abilities offends our egalitarian sensibilities. The gifted are seen as specially privileged and thus as not in need of special help. The second reason is the deep strain of anti-intellectualism that pervades our culture. While we do not mind providing specialized training to athletic students, or to students in the school orchestra, we resist providing advanced instruction for students with intellectual gifts.

In 1972, Sidney Marland, the US Commissioner of Education, issued a report that stated that only 4% of gifted children were receiving any kind of special service. Moreover, half of the superintendents surveyed in the report said that they had no gifted children in their school systems. Today, many teachers and superintendents react very differently to the question of the presence of gifted children in their midst. All of their students are gifted, they often insist.

Both responses are ways of avoiding the problem. Education for the gifted is under attack today. In 1993, Secretary of Education Richard Riley reported that only two cents of every 100 dollars spent on precollegiate education in 1990 went to gifted programs. And the 1996 federal budget has allocated only three million dollars for gifted education. We spend far more on education for

children with disabilities than on children with gifts.

But this is not a cry for more money to be spent on existing programs. Indeed, the problem needs to be construed differently. We need, first of all, to recognize the striking difference between moderately and profoundly gifted children. Profoundly gifted children are years ahead of their peers. They learn rapidly and independently, and have an extraordinary rage to master the area in which they have exceptional ability. These are the children who read voraciously (often nonfiction) before entering kindergarten, who turn everyday experiences into math challenges to solve, or who induce by themselves the rules of algebra, or the rules of phonics. Moderately gifted children, in contrast, are more appropriately described as bright children, children who may score 130 or so on an IQ test, who can achieve highly, but who do not show the kind of obsessive rage to master and striking precocity found in the profoundly gifted.

I believe we are wasting what slim resources we have for the gifted on minimal and bland programs for the moderately gifted. The most common form of service for gifted at the elementary school level is a pull-out enrichment class. What this means, typically, is that children who qualify (usually by scoring 130 on an IQ test)

leave their classrooms once or twice a week for a class in which they are grouped with others like themselves, and in which they engage in creative problem solving, projects, games, or field trips.

Enrichment classes are weak solutions to big problems. They offer only a few hours a week of possibly advanced instruction (the rest of the time students spend in the regular classroom), they offer little continuity, they do not allow students to study something in depth, and one kind of curriculum is offered to all gifted children, whether their gifts lie in mathematics, science, writing, etc. These classes are not clearly distinguishable from good classes for ordinary children. Moreover, research on these programs has shown them to be at best of modest benefit. Probably

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students of any ability level would benefit from the kinds of open-ended, project-based learning that goes on in the best enrichment classes.

Other solutions today include ability grouping in full time gifted classes (but only in some school districts) and moderate grade skipping. The entrance requirement into a gifted class is again typically a score of 130 on an IQ test. Students in these classes do achieve more than equally gifted children who remain in a mixed ability classroom, but the benefit remains modest. As for grade skipping, studies of moderate skipping show that this kind of acceleration has beneficial effects and is not harmful socially or emotionally.

Special school programs for the gifted clearly do have positive effects, and a good case can be made that our most gifted need more than what schools offer for most children. However, the benefits shown have always been modest. Moreover, most children in these programs are moderately, rather than profoundly gifted. This is because the entrance requirement for a gifted program is some demonstration of moderate gift, whether this be an IQ score of 130, an equivalent achievement test score, or a teacher recommendation. Profoundly gifted children, those whose IQs are far higher than 130, often remain underchallenged in gifted programs, underchallenged even in special schools for the gifted. These children do not find their appropriate level of stimulation until they reach college.

Moderately gifted children would not be bored in school and thus in need of special services if we did the obvious—raise the standards in our schools for all children. There is abundant evidence that when we raise the standards in classrooms, achievement rises for all levels of students, not just the brightest. This is the guiding philosophy of the Accelerated Schools Project founded by Henry Levin from Stanford. These schools treat low achieving children like gifted ones, and accelerate them rather than give them easy remedial work. And low achievers achieve more in accelerated than in standard remedial classes. (The same kind of successful policy was described by Michael Rutter in his 1979 book, *Fifteen Thousand Hours*, and by Ron Edmonds and Larry Lezotte in their studies of effective schools.)

Another strong piece of evidence that raising standards for all results in higher achievement levels from all comes from international comparisons of student achievement. It is by now well established that American schools have low standards compared to schools in many Western European and Asian countries. And American children fare poorly on achievement tests compared to children in most other developed countries! The only plausible explanation for the higher performance of average students in other countries

is that these students are held to higher expectations.

While elevating standards will mean that the moderately gifted will no longer be understimulated, the profoundly gifted will still be out of synch with what our schools can offer. We can be sure of this since even when profoundly gifted children are enrolled in schools for the gifted, they remain years ahead of their more moderately gifted classmates. It is these profoundly gifted children whom we need to identify, and these in whom we should invest resources for gifted education.

What kinds of programs should be offered for the extremely gifted? First, instead of the term "gifted class," why not use the more precise term "advanced class?" And rather than using an IQ test for admission, why not use what the student has actually achieved? Programs for the gifted have paid scant attention to critiques of IQ tests as narrow and arbitrary and as assessing test taking skills rather than the ability to think critically, understand complex materials, and break new intellectual ground. Another problem with IQ scores as admission criteria is that all too often an overall score is used.

An overall score tells us nothing about the student's particular area of gift. An IQ of 130 can be achieved by various routes. We should be using domain-specific kinds of identification so that students are selected as needing advanced instruction in math or

reading or writing, but not necessarily in all subjects. We should be following the approach pioneered by the Study of Mathematically Precocious Youth and carried on by the Center for Talented Youth (recently renamed as the Institute for the Academic Advancement of Youth), in which fast-paced intensive summer courses are offered in the student's domain of talent.

We are faced with a choice. We can choose to make adjustments in our schools for children with moderate intellectual gifts. Or we can choose to make educational adjustments for children with profound intellectual gifts. We have currently chosen the former option. We have thus had to spread our meager resources very thin, and have had to ignore the needs of the extremes. If we choose the latter option, we can focus on those who most need advanced instruction. Choosing the latter option need not mean sacrificing the needs of the moderately gifted. For if we elevated our standards, the moderately gifted could be appropriately challenged. ■

Accelerated Schools Project founded by Henry Levin from Stanford. These schools treat low achieving children like gifted ones, and accelerate them rather than give them easy remedial work.

A CASE AGAINST REVERENCE

Children say what they think, right or wrong, and, by doing that, open up possibilities for them to learn and for me to marvel.

Ashish Rajpal

I write "Agenda" on the board at the start of my class and turn around to see several blank faces, and quickly realize my presumptuous folly. "Ok, so how many of you know what this means?" I ask, as if that was part of the original plot. Nine year old Akash's hand flies up into the air. "I know sir, I know sir." I scan the class, then nod to Akash. He exults triumphantly: "If you are a boy or a girl, sir."

I wish I could say that spontaneous teaching moments like this are routine in my class. That children say what they think, right or wrong, and, by doing that, open up possibilities for them to learn and for me to marvel. But after six weeks in Grade 4 this term, I am more often confronted with pleasing obedience or artful adult mind reading, than with fear-to-the-winds directness, spontaneity, and wonder.

SO, WHO DUNNIT?

PARENTS. My own view, is closest to the Tiki Taki Boxes view. That is, "little boxes" the children, are actually a lot like the big ones, their parents. Who are only too happy to make them like themselves. Parents do too much with their children, in conditioning them for "right," "good," "well mannered" or "please me" responses. This is done in the subtlest of ways by completing their sentences, shushing them in front of others, or pointing out role model behaviors. Children quickly learn the one 'correct' way to keep mum happy.

PARENTS AGAIN! Anu Roy who runs a primary school in south Delhi, says, "when I ask the children what would you like to do this summer, and they say: 'Study, Ma'am.'" She adds, "It makes me cry." I asked her why she thought it was so. Anu too believes its parents, but in her case, she says home for most kids is about both working parents being away, a TV set blaring, and other adults who are disinterested or critical. So the moment a class is about caring teachers who listen - the kids can't wait to please.

TEACHERS. This is easy. "They are disinterested in the subject *and* the child!" Exclaims an unhappy parent. They want "perfect discipline" that avoids both, effort and uncomfortable questions. Children who conform are "good children." The rest are trouble.

THE SYSTEM. A year or so ago, in New York, I met a young professor who teaches Neuroscience at the revered University of Pennsylvania. We got talking and I figured that he had a large number of Indian students as fellows and researchers. I asked him if he experienced any differences between his Indian students and the others. He nodded and said; "Indians are great at solving problems. However, when

confronted with which problem to solve, they stumble". Not surprising if you come to think of it. The smartest kids in school were the ones who had the right answers. Not the right questions.

SO, WHERE DO WE LOOK FOR ANSWERS?

Consider culture. The Harvard psychologist and multiple intelligence guru, Howard Gardner has a very useful and unusual definition for 'intelligence.' He refers to it as the capacity to create ideas or products valued in a given culture. An obedient and obeisant Brahmin boy who answers within an instant of being asked, politely, monotonically; is seen as undoubtedly clever in one culture. In another culture, being clever might be about netting a huge catch at sea, or developing a lego-based robot while playing, or composing and performing a musical piece to an applauding audience.

Teachers can create a culture of learning in the school, and in the classroom. Irrespective of what happens at home, this is one place for *asking* questions - and not just answering them. It is a place for conversations around the questions. Big conversations. Small conversations. Wondrous conversations. Crazy conversations. Hard conversations. Irreverent conversations. What is democracy? How many legs does a beetle have? What if the moon was not there? What if we drank Coke upside down? What happened in Gujarat? How is your mother treated at home? The teacher must go to these places, as only she can, and open possibility beyond what is. Therein lies possibility. True thinking. Real learning.

Culture is indeed everything. In these past weeks with Grade 4, it is apparent that our culture values pleasing and conformity so much, that we are unwilling to let our children be who they are and see the world from their own eyes. In looking for inspiration maybe we need an alternate script(ure). Irreverent Bollywood lyrics maybe. The late Bollywood actor Johnny Walker's waltzing prescription from the 50's does it for me:

Cburi ban, kanta ban, O my son,

Sab kuch ban, Kissi ka chamcha nai ban!

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(This article first appeared in Mindfields 2, 2002)

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HOWARD GARDNER

India Tour 2012



iDiscoveri Education is honored to host the Howard Gardner India Tour 2012; the most significant public thought leadership engagement to touch the Indian education domain in several decades. Dr. Howard Gardner, the father of the famed theory of "Multiple Intelligences" and the legendary professor of cognitive psychology at the Harvard Graduate School of Education, is considered among the 100 most influential public intellectuals in the world. Prof. Gardner is a rare scholar who has been able to overturn the accepted direction of thought and action of for an entire domain across countries within his own lifetime. Through his research and writing he has reframed how psychologists, educators and policy makers think about what the human mind is gifted at and how best to nurture it to its full potential.